

ONKYO SERVICE MANUAL

STEREO CASSETTE TAPE DECK

MODEL TA-2090

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK \triangle ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

SPECIFICATIONS

Track Format:	4 tracks, 2 channels
Erasing System:	AC erase
Tape Speed:	4.8 cm/sec. (1-7/8 i.p.s)
Wow & Flutter:	0.02% (WRMS)
Frequency Response:	20-18,000Hz (25-17,000Hz \pm 3dB) (normal position tape) 20-20,000Hz (25-19,000Hz \pm 3dB) (high position tape) 20-22,000Hz (25-21,000Hz \pm 3dB) (metal position tape)
Signal-to-Noise Ratio:	60dB (metal position tape, Dolby NR out). A noise reduction of 10dB above 5kHz and 5dB at 1kHz is possible with Dolby B NR. A noise reduction of 20dB at 5kHz is possible with Dolby C NR. A noise reduction of 30dB is possible with dbx NR.
Input Jacks:	Mic jack ϕ : 2 Input sensitivity: 0.3mV/600 ohms Input impedance: 5 kohms Line IN: 2 Input sensitivity: 60mV Input impedance: 50 kohms DIN In Jack: 1 Input sensitivity: 0.1mV/1 kohm Input impedance: 2.7 kohms

ONKYO
AUDIO COMPONENTS

Outputs:	Line OUT: 2
	Std output level: 1100mV (odB) Optimum load impedance: over 10 kohms
	Headphone Jack: 1
	Optimum load impedance: 8--200 ohms
	DIN Out Jack: 1
	Standard output level: 1100mV (at OdB) Opt load impedance: over 10 kohms
Motors:	Brushless DD motor: 1 DC motors: 2
Heads:	Rec/PB: Sendust combination
	Erase: Dual gap ferrite
Semiconductors:	TR:130 Diodes:68 IC:38 LED:33
Power Consumption:	47 watts
Dimensions:	450(W) x 100(H) x 392(D) mm (17-11/16" x 3-15/16" x 15-7/16")
Weight:	9 kg. (19.8 lbs.)

- Specifications and external appearance are subject to change without notice because of product improvements.

SERVICE PROCEDURES

1. Insulation resistance measurement

Connect the insulating-resistance tester between the plug of power supply cord and chassis.

Specifications; 500 V more than 10 MΩ

2. Replacing the lamps

This unit used the lamps listed below.

Circuit No.	Parts No.	Description
Mechanism ⑥	24606173	50mA, 14V. Lamp
PL701	210090	150mA, 14V. Lamp

CAUTION: Before replacing the lamps, be sure to unplug the power supply cable.

FEATURES

3-Head Configuration

Having three heads is a must for all serious recordists because it allows monitoring the just-recorded signal while the recording is in progress. Another advantage is that the recording and playback head gap widths can be optimized for their respective tasks. To further enhance performance, the recording and playback heads are made of Sendust.

3 Motors with Direct-Drive Capstan Motor

Tape is driven by a brushless direct-drive motor. A second motor drives the reel tables and a third motor moves the head assembly up and down. This lowers wow and flutter to an insignificant 0.02% (WRMS).

Real Time Tape Counter

The electronic tape counter shows either the elapsed time during playback or recording or the time remaining until the end of the cassette in minutes and seconds.

Dolby B and C NR, dbx NR and Dolby HX Pro

This unit has all three of the most frequently used noise reduction systems, Dolby B NR, Dolby C NR and dbx NR, to meet all kinds of recording needs. This deck also has Dolby HX Pro to help prevent tape saturation and allow a tape to contain a wider dynamic range.

Fully Automatic ACCUBIAS

To fine tune the recording bias to the optimum point, simply put the deck in the rec/pause standby mode and press the ACCUBIAS button.

Multiple Mode Display for Six Deck Operating Modes

The head block position and tape speed are each shown in a graphic format by a total of six LEDs to permit quick confirmation of the current deck mode.

Auto Music Control System (A.M.C.S.)

The AMCS automatically locates the beginning of every song on a cassette in either the forward or the reverse direction. When the forward AMCS button is pressed during the play mode, the tape is rapidly wound to the beginning of the next song and the first 10 seconds (approximately) is played. Then the tape is rapidly wound forward to the beginning of the next song and about 10 seconds is played again. This process continues until the PLAY button is pressed to cancel AMCS operation and return to normal playback. When the reverse AMCS button is pressed during the play mode, this process is performed in the reverse direction.

Bright Fluorescent Peak Hold Level Meters

The colorful left and right peak hold level meters react instantaneously to changes in signal level and a peak-hold system maintains peak readings for a second to make sure you don't miss potentially harmful input signals when setting the recording level.

Single Song, Whole Side and Block Repeat Modes

With this deck, you have a choice of three ways to play a tape repeatedly: (1) Single repeat for one song; (2) Full repeat for an entire cassette side; (3) Block repeat for a section of the cassette between the [0:00] counter reading and any other counter reading.

Auto Space Rec Mute Button

This button lets you insert unrecorded sections five seconds in length with one touch simplicity.

Remote Control Unit Connector

With an optional remote control unit (such as the RC-5T), this unit can be controlled even while you are relaxing in your favorite chair. All transport modes are included: record, play, fast forward, rewind, stop and pause.

DESCRIPTION OF THE LM6402H-425 MICRO COMPUTER (DECK MECHANISM CONTROL)

1. ACCU BIAS operation

In more conventional optimum bias adjustment systems, ACCU BIAS operations were performed almost entirely by hardware. In the TA-2090, however, the major operations are handled by microcomputer. And in addition to the 5-bit D/A converter which enables greater accuracy in the adjustments, an operation which resembles successive comparisons is executed to further reduce the adjustment time. See Figure 1 for the block diagram.

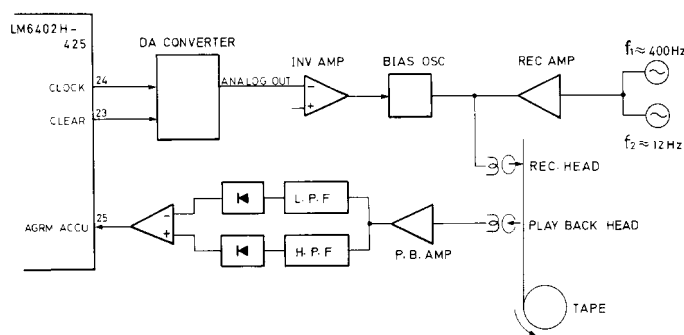


Fig. 1 ACCU BIAS block diagram

When the ACCU BIAS operation is started, a 400Hz/12kHz mixed signal is recorded, the bias current in this case being controlled by a signal from the microcomputer. The play-back signal is separated by filter into the original 400Hz and 12kHz signals, and after being rectified these signals are passed to a comparator where a comparison check is made to see if one of the signals is greater than the other. A HIGH comparator output indicates that the 12kHz signal is greater than the 400Hz signal, and a LOW output indicates that the 400Hz is lower than the 12kHz.

Although the bias was changed one step at a time from greater bias levels to smaller levels in more conventional systems, this would involve twice the amount of time if a 5-bit D/A converter was used. For this reason, optimum bias is found by the following method in the TA-2090.

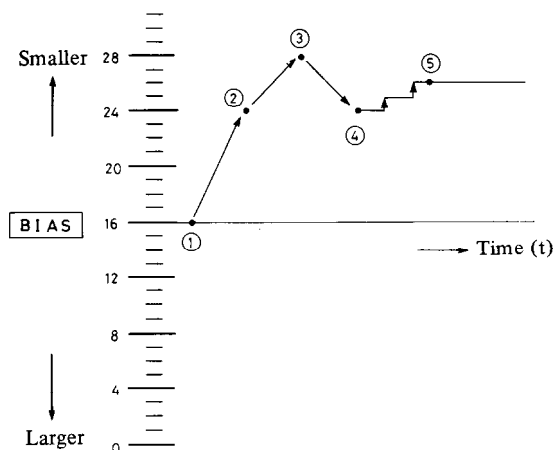


Fig. 2 Bias adjustment method

First the bias is set to step 16 which is in the center of the bias range shown in Figure 2. Then the 400Hz/12kHz mixed signal is subjected to a comparison operation to see which component is larger. If the 12kHz signal is larger, then the bias level is too small. If the 400Hz signal is larger, on the other hand, the bias level is too large. In the example shown in Figure 2, the bias level at step 16 is too large, so the bias is reduced by $\frac{1}{4}$ of the total range (8 steps) to position (2) where the 400Hz and 12kHz components are again compared. If the 400Hz signal is still larger than the 12kHz signal, the bias level is further reduced by $\frac{1}{4}$ of the total (4 steps) (3) and the components then compared again. This procedure is used for rough adjustment of the optimum bias. If at this stage, the 12kHz signal is now found to be greater than the 400Hz signal, the optimum bias is known to exist between steps 24 and 28. The operation is now switched to fine adjustment — the bias is increased by $\frac{1}{4}$ and then reduced one step at a time from step 24. The step where the component signal size relationship is switched from $400 > 12k$ to $12k > 400$ is taken as the optimum bias (5), and the bias is set at this level. This fine adjustment operation proceeds only from greater to lower bias levels in order to avoid misoperation due to possible drop outs. The effects of a drop out on the bias adjustment when the bias is changed from a smaller to a larger level is indicated in Figure 3, while the reverse case is indicated in Figure 4.

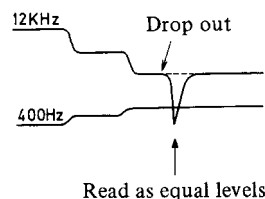


Fig. 3 Example of misoperation caused by drop out

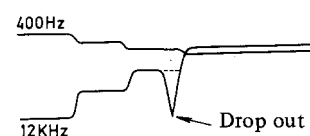


Fig. 4 Example where effect of drop out is avoided

2. DA Converter and Data Setting Method

The D/A converter circuitry is outlined in Figure 5, and the logic diagram of the 4024BP 7-stage binary counter in Figure 6. The 4024BP counter is counted up each time a negative input pulse is applied to the clock pin, the output data being obtained from Q1 thru Q7 (although only Q1 thru Q5 are actually used). This output is converted to an analog quantity when passed through the R-2R rudder resistance circuit.

If the power supply voltage is 5V, the voltage per step is approximately 0.156V with a total of about 4.84V. Since this 4024BP is only involved in up counting, setting to a value lower than the current value (that is, greater bias) results in an initial clearing and output of pulses until the set value is reached.

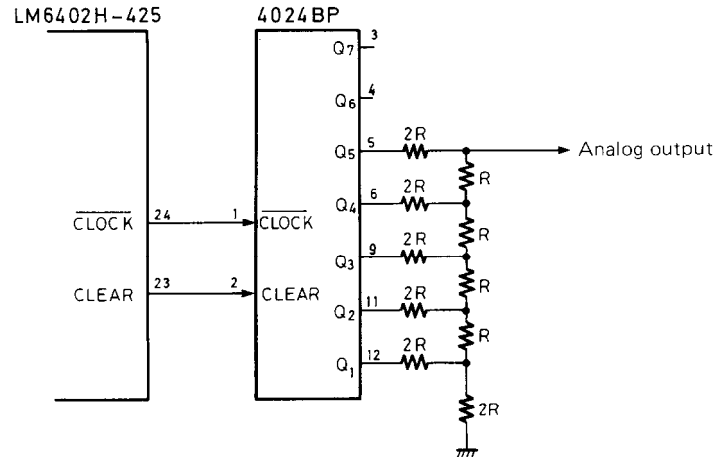


Fig. 5 DA converter circuitry

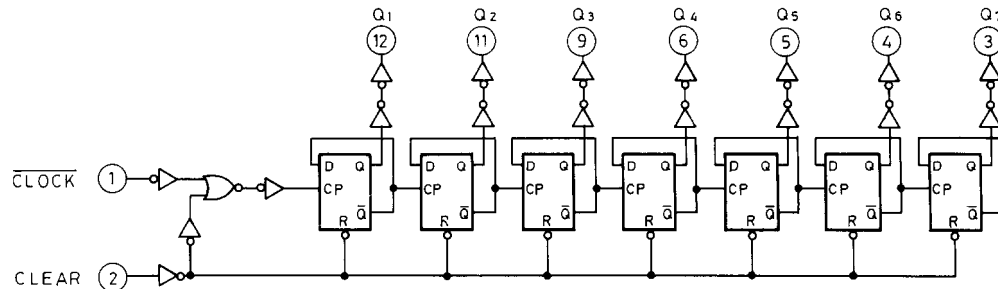


Fig. 6 4024BP logic circuit

3. Input Port Expander IC

The equivalent circuit of the LC7800 used to expand input ports is shown in Figure 7. This IC includes four 4-bit input ports, one 4-bit output port, and one 4-bit selector input port. When BA of the selector input is set to LOW and the other bits to HIGH, the A0" A1" A2" A3 input port is connected to the D0" D1" D2" D3 output port. And if only the BB bit is set to LOW, the B0" B1" B2" B3 input is selected. Hence, a LOW level signal is applied to the selector port bits in cyclic order, and the operation indicator LEDs are switched on and off dynamically in combination with the #13, #14, and #15 LED output ports while input port data is being read out.

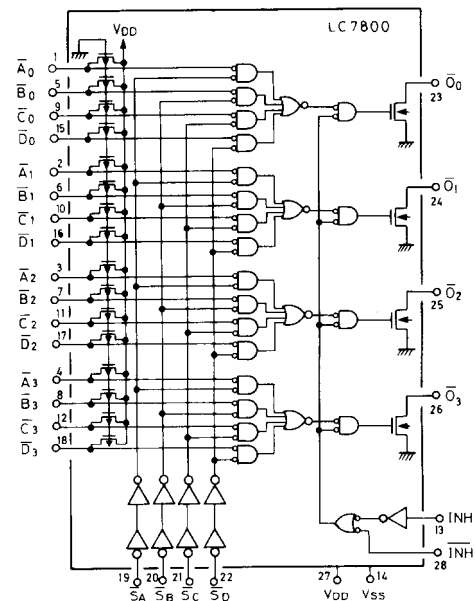
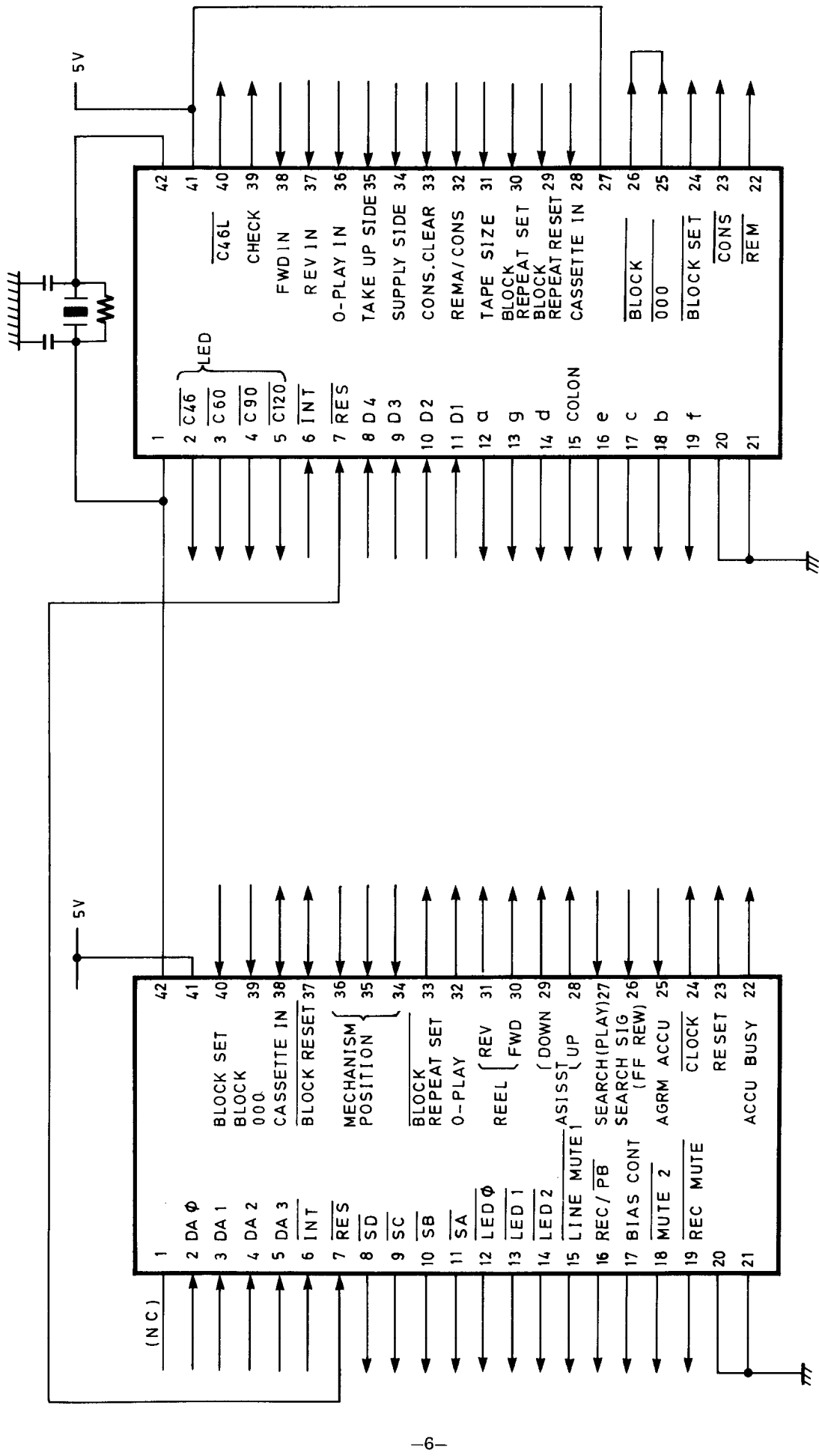


Fig. 7 LC7800 equivalent circuit

LM6402H-425 PIN ALLOCATION

Pin no.	Name	Function	Classification
2~5	DA0~DA3	Reading of data from the inport port expander IC	IN
6	$\overline{\text{INT}}$	Rotation signal input (for auto-stop operation)	IN
8~11	$\overline{\text{SA}} \sim \overline{\text{SD}}$	Input port expander IC and dynamic LED selector IC	OUT
12~14	$\overline{\text{LED0}} \sim \overline{\text{LED3}}$	Operation display dynamic LED data output	OUT
15	$\overline{\text{LINE MUTE 1}}$	Line muting output signal generated when the power is switched on, and during ACCU BIAS operation.	OUT
16	REC/PB	Output signal for muting DIN outputs when recording	OUT
17	BIAS CONT.	Output signal for control of bias oscillator	OUT
18	$\overline{\text{MUTE2}}$	Signal for switching muting off during playback	OUT
19	$\overline{\text{REC. MUTE}}$	Signal for muting the recording amplifier output	OUT
22	ACCU BUSY	Output signal generated during ACCU BIAS operation	OUT
23	RESET	Signal for resetting the D/A converter	OUT
24	CLOCK	Signal for setting data in the D/A converter	OUT
25	AGRM ACCU	ACCU BIAS matching input	OUT
26	SEARCH SIG (HIGH)	Input signal from high-speed travel tune-selector.	IN
27	SEARCH SIG (LOW)	Input signal from low-speed travel tune-selector amplifier	IN
28	UP	Output signal for driving the assist motor towards the PLAY position.	OUT
29	DOWN	Output signal for driving the assist motor towards the FF/REW position.	OUT
30	FWD	Output signal for driving the reel motor towards the FF position.	OUT
31	REW	Output signal for driving the reel motor towards the REV position.	OUT
32	O-PLAY	Reel motor torque switching output	OUT
33	$\overline{\text{BLOCK SET}}$	Output which informs the counter IC that the BLOCK SET key has been pressed.	OUT
34~36	a,b,c	Input ports for signal from the mechanism position switches	IN
37	BLOCK RESET	Output which informs the counter IC that the BLOCK RESET key, or any other key apart from the BLOCK SET key has been pressed.	OUT
38	CASSETTE IN	Input involved in detection of cassette half, and output which stops the capstan motor when an abnormal mechanism status is detected.	I/O
39	$\overline{\text{BLOCK MATCHING \& 000 INPUT}}$	Input of 000 input signal and BLOCK matching signal from the counter IC.	IN
40	$\overline{\text{BLOCK SET}}$	Input which accepts signals from the counter IC during BLOCK SET.	IN

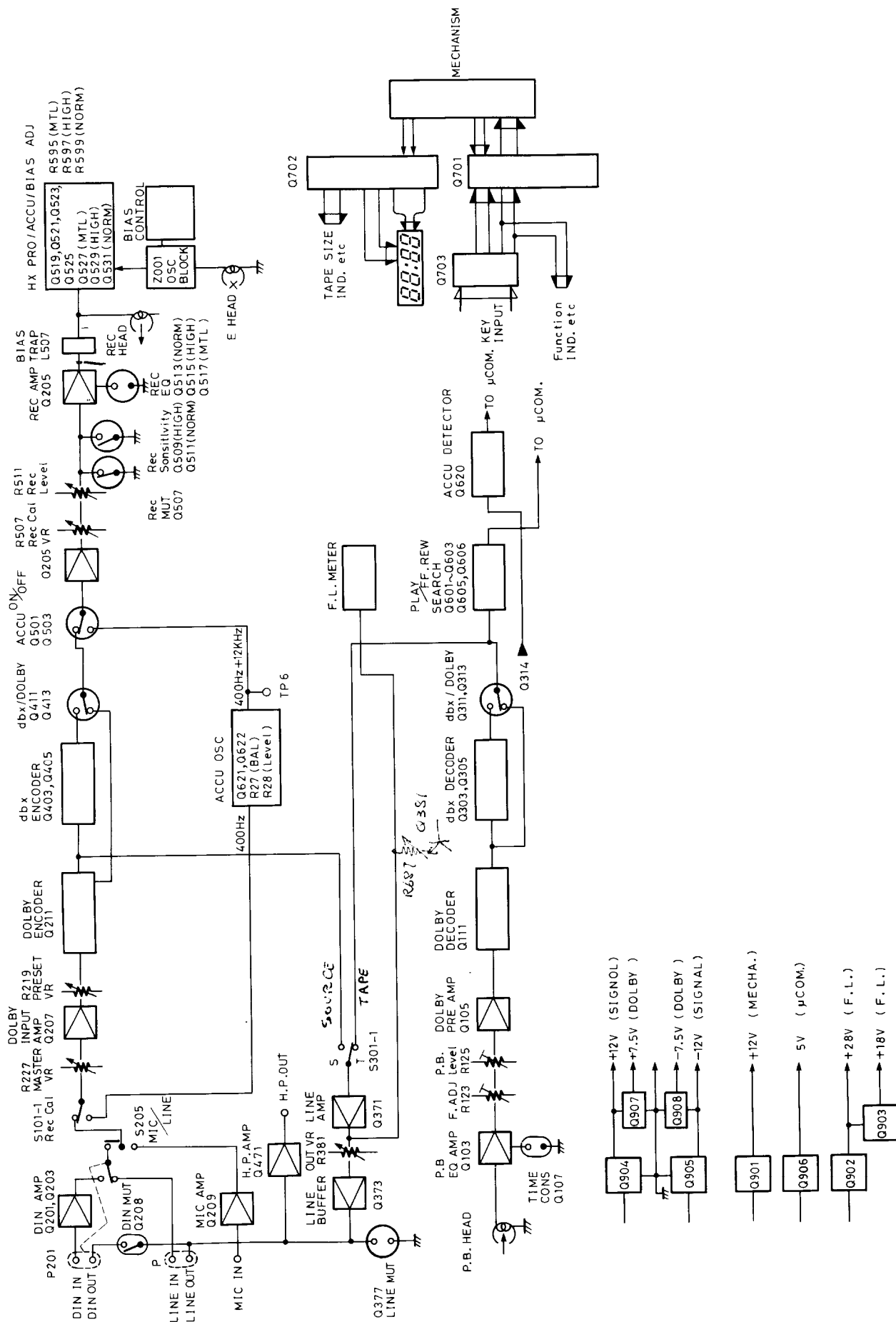
MICRO COMPUTER



Q702
LM6402H-424

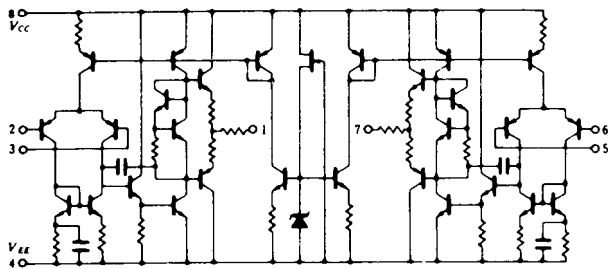
Q701
LM6402H-425

BLOCK DIAGRAM

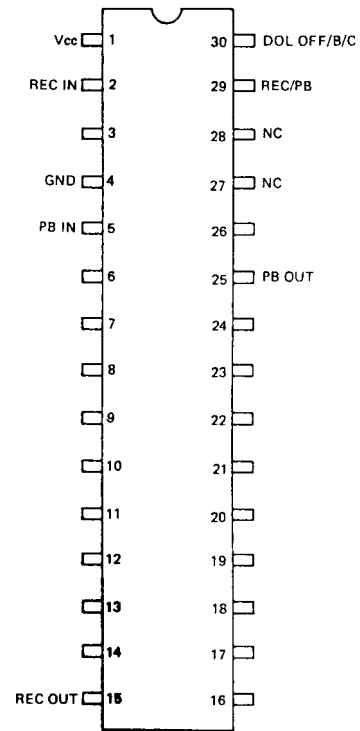


BLOCK DIAGRAM OF IC

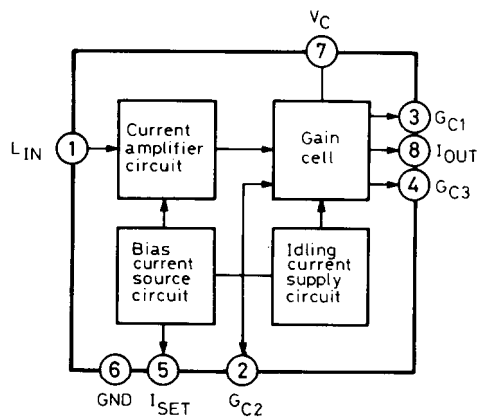
NJM4558, 4559, 4560 (Operation amplifier)



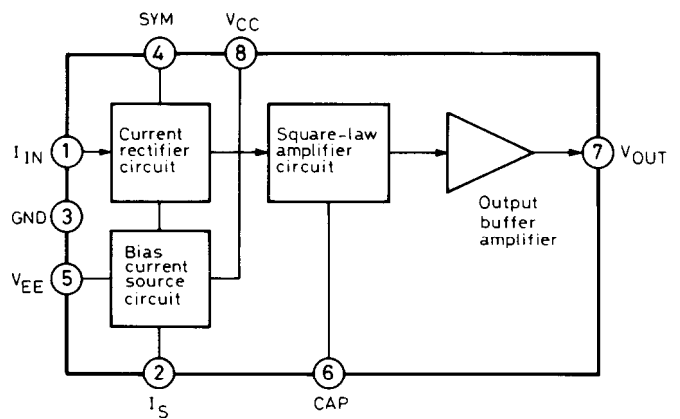
**HA-12058 NT
(DOLBY B & C TYPE NOISE REDUCTION SYSTEM)**



μ PC1252H2 (DBX)

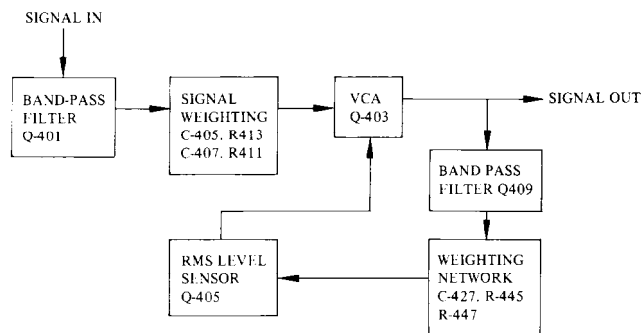


μ PC1253H2



BLOCK DIAGRAM OF DBX

dbx BLOCK DIAGRAM
(ENCODER)



SIGNAL WEIGHTING

Encoder side: Pre-emphasis Decoder side: De-emphasis Pre-emphasis raises the high frequencies of the input signal and de-emphasis returns the high frequencies to their original levels during playback. In addition to reducing overall noise, the effect of this process is to provide even more powerful high end noise reduction.

WEIGHTING NETWORK

This lowers the amount of VCA amplification for signals having a high degree of high frequency components in order to prevent distortion that would otherwise result if these high frequencies were recorded in the raised level set during pre-emphasis.

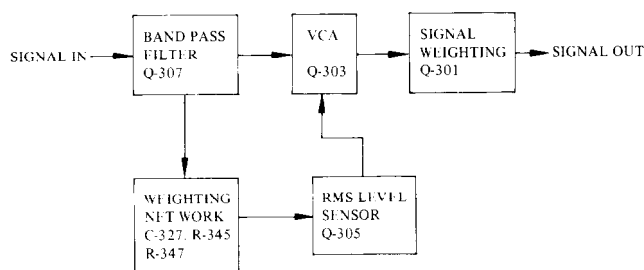
VCA (Voltage Controlled Amplifier)

An amp in which the amount of amplification is changed in a linear, logarithmic manner by the control DC voltage received from an external source. Serves to compress and expand the dynamic range of the input signal.

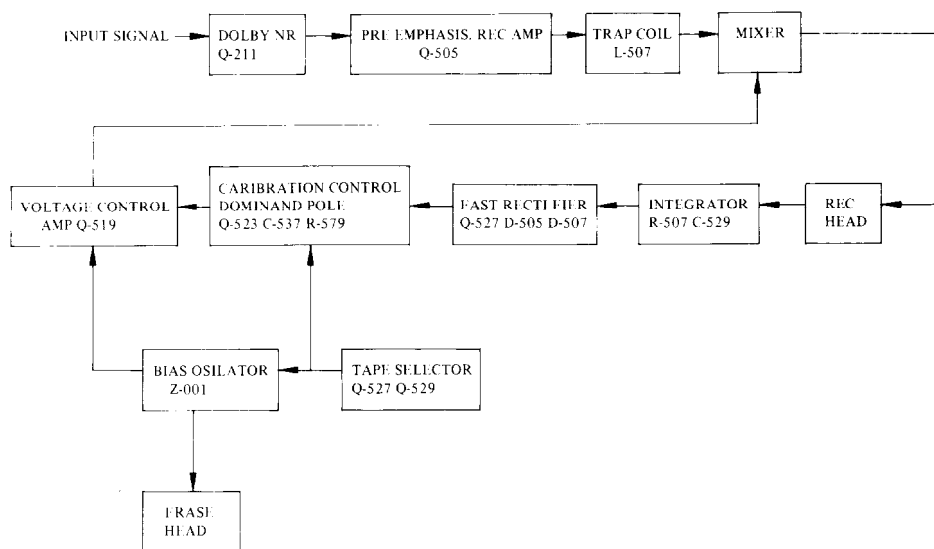
RMS LEVEL SENSOR

Detects the effective value (root mean square value) of the input signal and converts it into a DC voltage proportional to the logarithm of that level.

dbx BLOCK DIAGRAM
(DE-CODER)



BLOCK DIAGRAM OF HX PRO

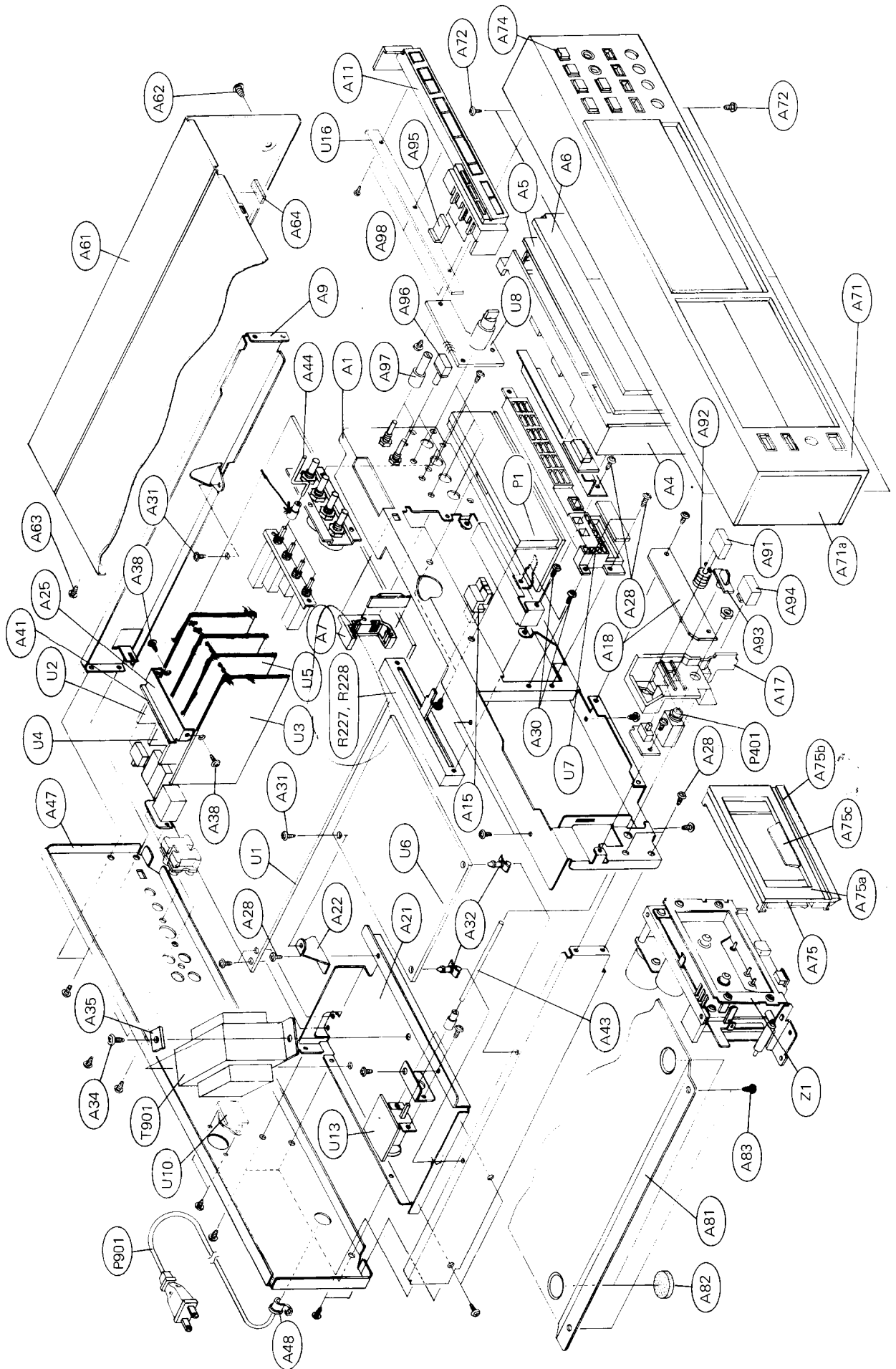


Dolby HX Pro

* Principle

Prevents disruption of flat frequency response caused by the biasing effect of high frequencies by continuously adjusting the bias current in response to the amount of frequencies over 10kHz in the signal being recorded.

CHASSIS-EXPLODED VIEW



CHASSIS-EXPLODED VIEW PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
A1	27110224A	Front bracket	A81	27170180	Bottom board
A4	27190293	Holder	A82	27175028	Leg
A5	28133106A	Back plate	A83	834430068	3TTS+6B (BC), Tapping screw
A5a	28199126A	Film	A91	28321636A	Knob, eject
A6	28191263A	Clear plate, edge	A92	27180179	Spring
A7	27190295	Holder, lamp	A93	28321681	Knob, switch
A9	27115164A	Side bracket	A94	28321394	Knob, power
A11	28321625	Knob ass'y.	A95	28321673	Knob, tape
A12	27262300	Plate	A96	28321637A	Knob, push
A14	27300702	Plate, slide volume	A97	28321638A	Knob S
A15	28321640A	Knob, slide volume	A98	28321639A	Knob, output
A16	27180218	Spring, ground	P1	212024	LB135-L16XMC2T34, Level meter
A17	27190296A	Holder H	P401	25045124	HLJ-4608-01-020, Stereo headphone terminal
A18	28175093	Insulator plate	Δ P901	253097B	AS-UC-3, Power supply cord D
A19	27150186	Shielded plate		253099B	AS-CEE, Power supply cord G/W
A20	87643008	W3x8F (BC), Flat washer	R227, R228	6142035	N100LG50KA25F, Resistor, variable, input level
A21	27130362A	Bracket, power transformer	Δ S902	25065123	NSS-1258P, Voltage selector switch W
A22	27140917	Bracket S	Δ T901	230823	NPT-846D, power transformer D
A24	27140918	Bracket D		230824	NPT-846G, power transformer G
A25	27140919	Bracket U		230825	NPT-846D/G, power transformer W
A26	27140577	Bracket DIN	U1	1138572	NAAF-2072, Main circuit pc board ass'y
A27	833420068	2TTP+6B (BC), Tapping screw	U2	1138573	NADOL-2073, Dolby decoder pc board ass'y
A28	834430068	3TTS+6B (BC), Tapping screw	U3	1138574	NADOL-2074, Dolby encoder pc board ass'y
A29	834426068	2.6TTS+6B (BC), Tapping screw	U4	1138575	NADOL-2075, DBX decoder pc board ass'y
A30	82143006	3P+6FN (BC), Pan head screw	U5	1138576	NADOL-2076, DBX encoder pc board ass'y
A31	831430088	3TTW+8B (BC), Tapping screw	U6	1138577	NACOC-2077, Control circuit pc board ass'y
A32	27190009	Holder	U7	1138578	NADIS-2078, Display circuit pc board ass'y
A34	830440109	4TTC+10C (BC), Tapping screw	U8	1138579	NASW-2079, Switch pc board ass'y
A35	870065	Special washer	U9	1138580	NADIS-2080, Display circuit pc board ass'y
A36	86414010	FWN4x10FN, Flange nut	U10	1138581	NARM-2081, Remote control terminal pc board ass'y
A38	880009	Rivert	U11	1138582	NASW-2082, Switch pc board ass'y
A39	262011	Tape, silver	U12	1138583	NASW-2083, Switch pc board ass'y
A40	28140555	10x36x3mm, Cushion	U13	1138584	NASW-2084, Power switch pc board ass'y
A41	28140559	10x55x10mm, Cushion	U14	1138585	NAPL-2085, Edge light pc board ass'y
A43	27260148	Shaft	U15	1138586	NAVR-2086, Record carib-ration volume pc board ass'y
A44	27260150A	Shaft P	U16	1138587	NASW-2087, Switch pc board ass'y
A47	27120624	Back panel D	Z1	244066	NDM-58, Tape mechanism ass'y
Δ A48	27120625	Back panel G			
	27120626	Back panel W			
	270025	SR-3P-4, Strainrelief D			
A50	801230	SR-4K-4, Strainrelief G/W			
A51	834430108	3STS+8BQ (BC), Tapping screw			
A52	82142604	3TTS+10B (BC), Tapping screw			
A61	28184237	2.6P+4F (BC), Pan head screw			
A62	28184237	Top cover			
A63	838440089	4TTB+8C (BC), Tapping screw			
A64	838430088	3TTB+8B (BC), Tapping screw			
A66	28140408	3x10x36, Cushion			
A71	11388121	Front panel ass'y			
A71a	28125149	End cap L			
A71b	28125150	End cap R			
A71c	27267347	Guide E			
A71d	27267279	Guide, power			
A71e	28191264A	Clear plate			
A74	28321674	Knob ass'y repeat			
A72	838430068	3TTB+6B (BC), Tapping screw			
A73	838430088	3TTB+8B (BC), Tapping screw			
A75	28400190	Cassette lid ass'y			
A75a	28400191	Window			
A75b	27262301	Plate C			
A75c	2191265	Clear plate C			
A76	880009	Rivert			

NOTE

D : 120V AC,60Hz
G : 220V AC,50Hz
W : 120 or 220V AC,50/60Hz

NOTE: THE COMPONENTS IDENTIFIED BY MARK Δ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PARTS NUMBER SPECIFIED.

ADJUSTMENT PROCEDURES

PRECAUTIONS

- Before adjustment, clean the following parts with an alcohol moistend swab.
 - * record/playback head
 - * erase head
 - * pinch roller
 - * capstan
- Do not use magnetized screwdriver for adjustments.
- Demagnetize record/playback head with a head demagnetizer.

TEST EQUIPMENT/TOOLS REQUIRED:

Audio oscillator
 Digital frequency counter
 Oscilloscope
 Attenuator
 AC voltmeter DC voltmeter voltmeter

Blank tapes (completely erased)

NORMAL.....NEW UD 90
 HIGH.....NEW XL-II 90
 METAL.....NEW MX 60

Test tapes

VTT-658 : 10 kHz, -15 dB
 MTT-111 : 3 kHz, -10 dB
 MTT-150 : Dolby level calibration
 400 Hz tone 200 nWb/m

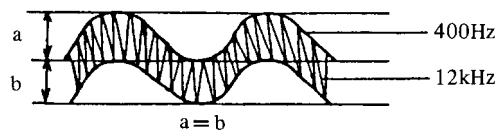
Item	Connection of instrument	Line input	Test tape	Mode	Output indicator	Adjustment point	Adjust	Remarks
1 Playback torque			TW-2111	PB	TW-2111	R761	35 to 55gcm	
2 Tape speed	Frequency counter to LINE output terminal		MTT-111	PB	Frequency counter	Semi-fixed on the moter	3,000 to 3,010Hz	
3 Head azimuth	AC voltmeter and oscilloscope to LINE output terminal		VTT-658	PB	AC voltmeter	Head azimuth screws	Maximum and same phase at channels L and R.	See fig. 1 Set the semi-fixed resistors R123 and R124 to center position.
4 Playback level	AC voltmeter terminals TP-3 and TP-4		MTT-150	PB	AC voltmeter	R125 (Ch. L) R126 (Ch. R)	580mV	
5 Meter			MTT-150	PB	Level meter	R687 R688	OdB indicator lights on	
6 Bias current	Fig. 2	400Hz, -20dB and 12kHz, -20dB	MAXELL UD-IC90	REC/PB	AC voltmeter	R599 (Ch. L) R600 (Ch. R)	Same level at REC/PB AND SAME LEVEL AT HX PRO ON/OFF	INPUT VOLUME maximum HX PRO ON NORMAL TAPE
	R563 & R564 MUST BE ADJUSTED TO COMPENSATE FOR 5 OR 6 DB INCREASE BETWEEN HX PRO ON & OFF TOGETHER WITH R599/R600					R563 R564	Same level +5 at HXPRO +6 ON/OFF dB	HX PRO OFF NORMAL TAPE
			HIGH XL-IC90 METAL MXC-60			R597 HIGH R598 R595 METAL R596	Same level at REC/PB	HXPRO ON HIGH, METAL TAPE
7 Record level	Fig. 2	1kHz		REC PAUSE	AC voltmeter AC voltmeter	Attenuator or AF OSC output R511 R512	775mV Same level at source and tape position of MONITOR switch	INPUT VOLUME maximum ACCUBIAS ON/OFF OFF

ACCUBIAS oscillator adjustment

Connect the oscilloscope and AC voltmeter to the terminal TP-6.
 Set Rec. Cal. switch to on.

Adjust the semi-fixed resistor R27 so that the 400Hz and 12.5kHz mixing signals become same level (a=b) as shown below.

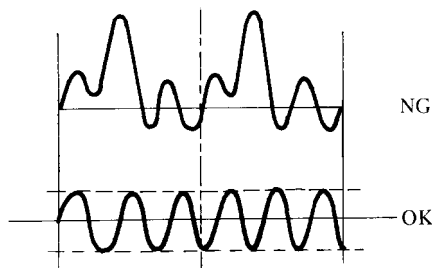
Adjust R29 so that the AC voltmeter indicator becomes 70mV.



DBX Adjustment

* Encoder

Receive a 1kHz signal through LINE and, when the LINE OUT output is 775mV, adjust R419 (Left) and R420 (Right) so that distortion is minimized as shown on a distortion meter connected to the output of TP (Left: J7 Right: J8) of NADBX-2076. At the same time, adjust so that the distortion waveform is as shown below (not more than 0.5%). Then, lower the input level at TP by 10dB and confirm that the TP output goes down by 5dB (1/2 compression).



* Decoder

Input a 1kHz signal from the P.B. head input (p101) and adjust the input so at TP of NADBX-2075 (Left: J11 Right: J12) the level is between 500mV and 1V (R301 and R302 are centered). Then, as in the encoder section, adjust R319 (Left) and R320 (Right) so that distortion and the waveform are both minimized. Then, lower the input level at TP by 10dB and confirm that the TP output goes down by 20dB (2X expansion).

* Overall performance

Input a 1kHz signal through LINE IN and, while recording that signal, adjust R301 (Left) and R302 (Right) of NADBX-2075 so that the level is the same for when dbx is in and out.

Operation Checks for Special Circuits

1. HX Pro

Record a 12.5kHz signal and, while playing it back, confirm that the level is raised by the following values when HX Pro is switched on compared with when HX Pro is left off:

Normal tape: 5 -- 6dB

High tape: 5 -- 6dB

Metal tape: 0 -- 1dB

2. dbx

Decode

With dbx out, record 1kHz at 0dBm and -10dBm, rewind the tape and play the tape with dbx in. At this time, the 0dBm should now be +7dBm and the -10dBm should be -13dBm (using normal tape).

Encode

With dbx in, record 1kHz at 0dBm and -10dBm, rewind the tape and play the tape with dbx out. At this time, the 0dBm should now be -3.5dBm and the -10dBm should be about -8.5dBm (using normal tape).

3. Accubias

Confirm that Accubias is set when using a standard tape, then record 15kHz at -20dBm and play it back. If the level when Accubias was set is within ± 1.5 dB of the level when Accubias was reset, the Accubias circuit is functioning properly.

4. Recording Calibration Adjustment Range

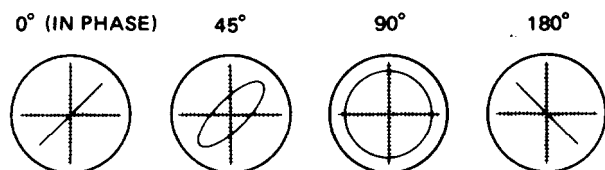
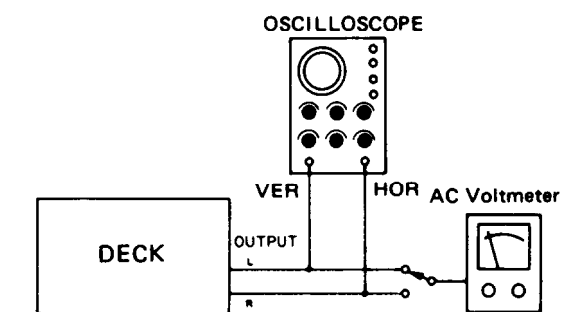
(Master VR Max, Preset Center)

With the recording calibration on and the deck in the source mode, confirm that the meter is reading 0 to +1dB and make a recording. Then confirm that the meters fluctuate between +3dB and -3dB when the calibration VR is rotated back and forth while the recording is played back with the deck in the tape mode.

5. Preset VR Adjustment Range

(Master VR Max, Rec Cal Center)

Using the method described in section four, confirm that the meters fluctuate between +2dB and -2dB when the calibration VR is rotated back and forth.



Confirming phase relationship

fig-1

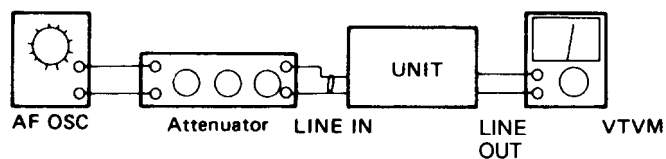
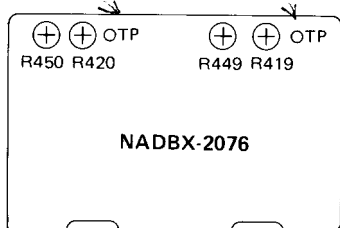
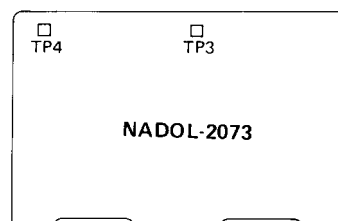
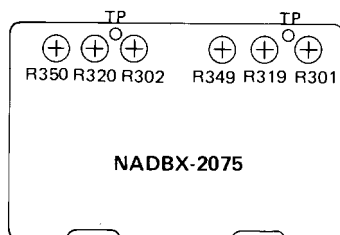
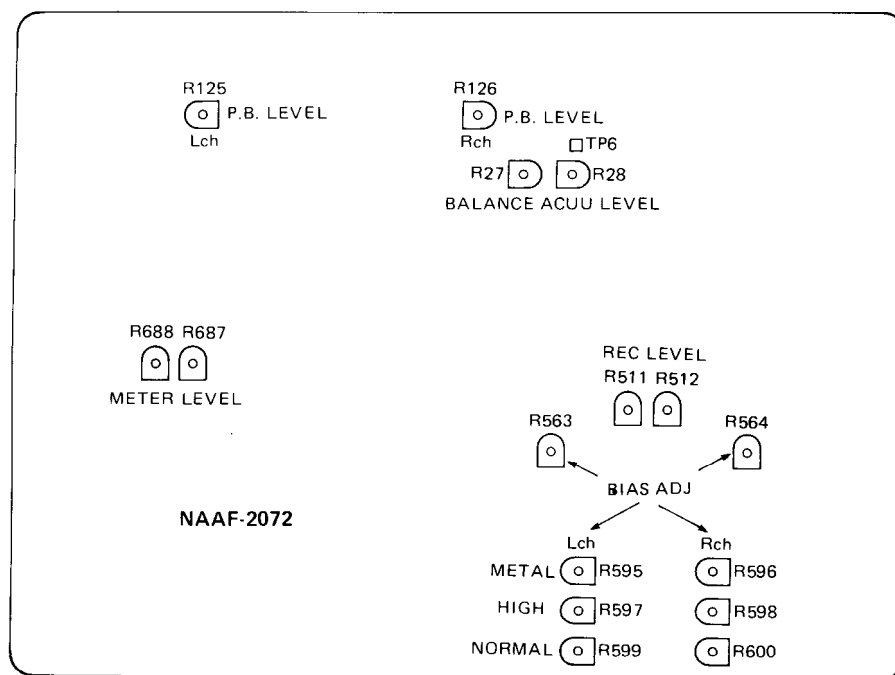
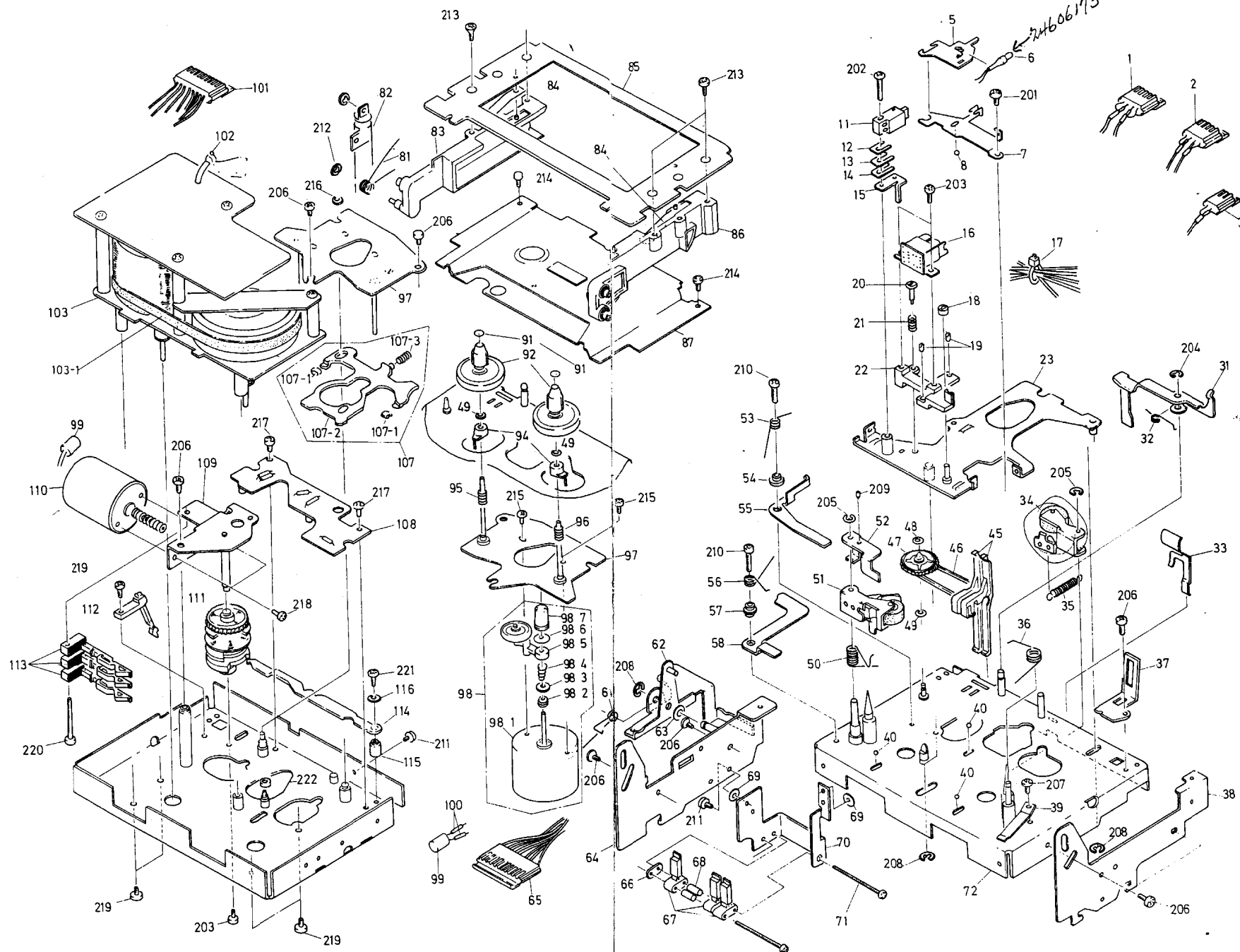


fig-2



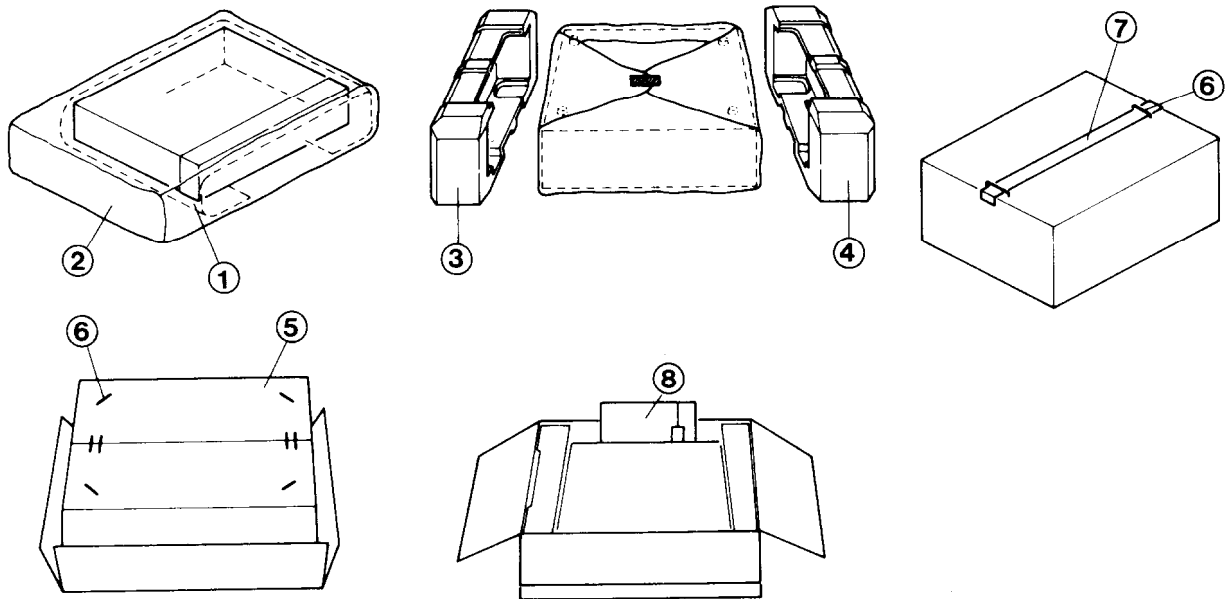
← 24606173 DO13*



TAPE MECHANISM-PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
5	24610498	Holder, lamp	85	24610949	Frame
6	24606173	50mA, 14V, Lamp	86	24611071	Holder R
7	24610669	Plate, holding, head	87	24611019	Panel, cassette
8	24610943	3mm, Steelball	94	24611072	Holder, spring
11	24600047	Erase head	95	24605505	Spring
12	24611060	t0.06, Spacer	96	24605501	Spring
13	24611061	t0.03, Spacer	97	24611073	Bracket, motor
14	24611062	0.1t, Spacer	98	24601171	Reel motor ass'y
15	24610653	Plate, erase head	98-1	24601169	Reel motor
16	24600030A	Rec/pb head	98-2	24611048	Holder, spring
18	24610495	Adjusting nut	98-3	24610374	Washer
19	801251	2x4mm, Screw	98-4	246-5512	Spring
20	24610652	Shaft	98-5	24602274	Lever, idler
21	24605502	Spring	98-6	24610970	Felt
22	24611063	Head block	98-7	24602273	Motor pulley
23	24611064	Head base ass'y	99	352942206	22μF, 16V, Non-polar elect. capacitor
31	24603284	Lever, reader	100	24604066	Tube
32	24605506	Spring	102	24601152	Binder
33	24605507	Spring, holding, cassette	103	24601172	DD motor ass'y
34	24602270	Pinch roller ass'y	103-1	24602275	Belt
35	24605244	Spring	107	24611043	Brake plate ass'y
36	24605508	Spring	107-1	24610999	Brake rubber
37	24610659A	Protector	107-2	24611053	Brake plate
38	24610846	Bracket R	107-3	24605472	Spring
39	24605188	Spring, cassette	108	24606206	Sensor pc board ass'y
40	24610351	Steelball	109	24611074	Bracket ass'y
45	24603205	Lever, rec.	110	24601103	Assist motor
46	24602271	Belt	111	24602133	Cam gear
47	24601167	Pulley ass'y	112	24606104	Leafswitch
48	24611003	1.8x3.8x0.5mm, Washer	113	24606119	Leafswitch
49	24611047	2.1x4.5x0.1mm, Washer	114	24611075	Connector plate
50	24605509	Spring	115	24604064	Collar
51	24602272	Pinch roller ass'y	116	87712808	2.8x8x1mm, Washer
52	24611065	Lever, adjusting	201	833130049	3x4mm, Pan head screw
53	24605510	Spring	202	82512012	2x12mm, Binding screw
54	24604065	Collar	203	801250	4mm, Pan head screw
55	24603286	Lever, selector	204	8930251	E washer
56	24605511	Spring	205	8930201	E washer
57	24610344	Collar	206	833125059	2.5x5mm, Tapping screw
58	24611066	Lock plate	207	801292	2x3.2mm, Tapping screw
61	24605504	Spring	208	893030	3mm, E washer
62	24603285	Lever, cancel	209	801263	2x3mm, Screw
63	8771441005	Washer	210	833125069	2.5x6mm, Pan head screw
64	24611067	Side bracket L	211	801325	2x5mm, Pan head screw
66	24611057	Washer	212	891024	Circlip
67	24606205	Leafswitch	213	835426082	2.6x8mm, Tapping screw
68	24604063	Collar	214	801326	2.5x3.5mm, Pan head screw
69	87712705	2.7x5x0.5mm, Washer	215	82512603	6x3mm, Binding screw
70	24611068	Bracket, switch	216	863720	N-2BN, Nut
71	82112030	Pan head screw	217	833125049	2.5x4mm, Tapping screw
72	24611069	Chassis	218	801259	2x3mm, Screw
81	24605456	Spring	219	833126067	2.6x6mm, Tapping screw
82	24611051	Damper unit	220	833125209	2.5x20mm, Tapping screw
83	24611070	Holder L	221	833126127	2.6TTP+12S, Tapping screw
84	24605463	Spring	222	863126	N-2.6F, Nut
REF. NO.	PART NO.	DESCRIPTION			
91	24610349	Washer			
92	24602299	Reel stand ass'y			

PACKING VIEW



D Model

REF. NO.	PARTS NO.	DESCRIPTION
1	29095012-1	500x800, Protection sheet
2	290311A	620x550, Poly bag
3	29090922	Pad (L)
4	29090923	Pad (R)
5	29050983	Master carton box
6	282301	Sealing hook
7	260012	Damplon tape
8	Accessory bag ass'y	
	29340802	Instruction manual
	2010095	Connection cable
	29365006-5	Warranty card (N)
	29358002A	Service station list (N)
	29100005	220x330, Poly bag

G/W Model

REF. NO.	PARTS NO.	DESCRIPTION
1	29095012-1	500x800, Protection sheet
2	290311A	500x750, Poly bag
3	29090922	Pad (L)
4	29090923	Pad (R)
5	29050983	Master carton box
6	282301	Sealing hook
7	260012	Damplon tape
8	Accessory bag ass'y	
	29340803	Instruction manual
	2010095	Connection cable
	25055040	Conversion plug CV-K-2 (W)
	29100005	220x330, Poly bag

NOTE

- (N): Only U.S.A. Model
(W): Only 120/220V Model

PRINTED CIRCUIT BOARD PARTS LIST

Main circuit pc board (NAAF-2072)

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
	ICs				
Q105	222811 or 222502	NJM4558DD or NJM4558DX	Q907	2211683 2201285 or 2201286	2SD468 (C) 2SD882 (Q) or 2SD882 (P)
Q207, Q209	222811 222502 or 222534	NJM4558DD, NJM4558DX or NJM4559DX	Q908	2201275 or 2201276	2SB772 (Q) or 2SB772 (P)
Q371	222736 or 222652	NJM4558S or M5218L	Q909	2211612 or 2211683	2SD471 (L) or 2SD468 (C)
Q373, Q471	222652	M5218L		Diodes	
Q505, Q506	222652	M5218L	D201, D202	223155	1SS138
Q521	222735	NJM072D	D301-D304	223145,	1S2076TD,
Q523, Q524	222681 or	IR3702 or	D520, D619	223150,	US1040,
Q603, Q620	222695	LA6324		223105 or	1S1555 or
Q904	222780120	7812, Const. voltage, +12V		223133	DS442X
Q905	222790120	7912, Const. voltage, -12V	D401-D404	223155	1SS138
Q906	222780050	7805, Const. voltage, +5V	D501-D516	223155	1SS138
	Transistors		D517	2239673,	RD15EB3,
Q101-Q104	2211406,	2SC2240 (BL),	D603-D606	2243253 or	MTZ15C or
Q201, Q202	2211896 or 2212256	2SC1815L (BL) or 2SC2458 (LL)		2242922	EQA02-14B
Q107, Q108	2211255,	2SC1815 (GR),	D519	223155	1SS138
Q203, Q204	2212115, 2210746 or 2212485	2SC2458 (GR), 2SC945A (P) or JC501 (Q)	D601, D602	223155	1SS138
Q205, Q206	2212303, 2212304, 2210746 or 2211945	2SK381 (C), 2SK381 (D), 2SK246 (Y) or 2SK246 (GR)	D607, D608	223155	1SS138
Q311-Q314	2212304, 2212305, 2211945 or 2211946	2SK381 (D), 2SK381 (E), 2SK246 (GR) or 2SK246 (BL)	D611-D614	223132	1K60
Q377, Q378	2211705 or 2211706	2SD655 (E) or 2SD655 (F)	D616	2239451, 2243141 or 2242836	RD5.1EB1, MTZ5.1A or EQA-02-05C
Q381, Q382	2211255,	2SC1815 (GR),		223155	1SS138
Q507-Q518	2212115,	2SC2458 (GR),	D617, D618	223155	1SS138
Q527-Q532	2210746 or	2SC945A (P) or	D620	223155	1SS138
Q601, Q602	2212485	JC501 (Q)	D621	223145,	1S2076TD,
Q411-Q414	2212304,	2SK381 (D),		223150,	US1040,
Q501-Q504	2212305, 2211945 or 2211946	2SK381 (E), 2SK246 (GR) or 2SK246 (BL)		223105 or	1S1555 or
Q519, Q520	2211255	2SC1815 (GR)	D622, D623	223133	DS442X
Q533	2211554	2SA562TM (Y)	D624	223155	1SS138
Q534, Q623	2211454,	2SA1015 (Y),		2239513,	RD6.8EB3,
Q605, Q606	2212124, 2210804 or 2212494	2SA1048 (Y), 2SA733A (Q) or JA101 (P)		2243173	MTZ6.8C or
Q535, Q537	2211254,	2SC1815 (Y),		2242855	EQA02-07B
Q538, Q607	2212114,	2SC2458 (Y),	D901, D902	223868	2W02
Q624	2210747 or 2212484	2SC945A (Q) or JC501 (P)	D903, D904	223848	GP-08B
Q536	2211683 or 2211612	2SD468 (C) or 2SD471 (L)	D905	223842	GP-15B
Q608, Q617	2211255,	2SC1815 (GR),	D906	2239653, 2243243 or 2242911	RD13EB3, MTZ13C or EQA02-18B
Q610-Q613	2212115,	2SC2458 (GR),		2239794,	RD27EB4,
Q619, Q621	2210746 or	2SC945A (P) or		2239811,	RD30EB1,
Q622, Q625	2212485	JC501 (Q)		2243021 or	EQA02-28A or
Q609, Q614	2211455,	2SA1015 (GR),		2243022	EQA02-28B
Q615, Q616	2212125,	2SA1048 (GR),	D908	2239732,	RD20EB2,
Q618,	2210803 or 2212495	2SA733A (P) or JA101 (Q)		2243282 or 2242962	MTZ20B or EQA02-18B
Q901	2201340 or 2201350	2SD1128 or 2SD687	D910, D911	2239551, 2243191 or 2242865	RD8.2EB1, MTZ8.2A or EQA02-08B
Q902, Q903	2211612 or	2SD471 (L) or	D912, D913	223155	1SS138
			D914	2239673, 2243253 or 2242922	RD15EB3, MTZ15C or EQA02-14B
				Coils	
			L501, L502	231041 or 24606070	NCH-2081 or NCH-1008
			L503, L504	231038 or 24606080	NCH-2078 or NCH-1022
			L505, L506	231057	NCH-4102
			L507, L508	233329	NCH-6101
			L509, L510	231058	NCH-4103
			L511, L512	231025	NCH-1064
				Osc. block	

REF. NO.	PART NO.	DESCRIPTION
Z001	24606199	NOB-030
	Capacitors	
C103, C104	392880337	3.3 μ F, 50V, LL
C109-C112	352741009	10 μ F, 16V, Elect.
C201, C202	392880107	1 μ F, 50V, LL
C203, C204	352780109	1 μ F, 50V, Elect.
C211, C212	392883397	0.33 μ F, 50V, LL
C213, C214	352783399	0.33 μ F, 50V, Elect.
C371-C374	352750479	4.7 μ F, 25V, Elect.
C471, C472	352744709	47 μ F, 16V, Elect.
C501, C502	352750479	4.7 μ F, 25V, Elect.
C503, C504	352783399	0.33 μ F, 50V, Elect.
C521, C522	352780479	4.7 μ F, 50V, Elect.
C539	352722219	220 μ F, 6.3V, Elect.
C540	352751019	100 μ F, 25V, Elect.
C543	352780479	4.7 μ F, 50V, Elect.
C605	352782299	2.2 μ F, 50V, Elect.
C609, C610	352780109	1 μ F, 50V, Elect.
C611, C613	352750479	4.7 μ F, 25V, Elect.
C612	352780109	1 μ F, 50V, Elect.
C615	352741009	10 μ F, 16V, Elect.
C620	352750479	4.7 μ F, 25V, Elect.
C621	352780109	1 μ F, 50V, Elect.
C622	352750479	4.7 μ F, 25V, Elect.
C623	352751009	10 μ F, 25V, Elect.
C631	352784799	0.47 μ F, 50V, Elect.
C632	352750479	4.7 μ F, 25V, Elect.
C633	352741009	10 μ F, 16V, Elect.
C634	352732209	22 μ F, 10V, Elect.
C640	352741009	10 μ F, 16V, Elect.
C641	352742209	22 μ F, 16V, Elect.
C644, C646	352750479	4.7 μ F, 25V, Elect.
C645	352741009	10 μ F, 16V, Elect.
C905	352752229	2,200 μ F, 25V, Elect.
C906, C907	352784719	470 μ F, 50V, Elect.
C908	352742219	220 μ F, 16V, Elect.
C909	352741019	100 μ F, 16V, Elect.
C910	352764709	47 μ F, 35V, Elect.
C911	352751009	10 μ F, 25V, Elect.
C913, C914	352752229	2,200 μ F, 25V, Elect.
C915	352783399	0.33 μ F, 50V, Elect.
C916	352780229	2.2 μ F, 50V, Elect.
C917	352781099	0.1 μ F, 50V, Elect.
C918	352780109	1 μ F, 50V, Elect.
C919	3504168	13,000 μ F, 25V, Elect.
C920	352783399	0.33 μ F, 50V, Elect.
C921	352781099	0.1 μ F, 50V, Elect.
C922, C923	352731019	100 μ F, 10V, Elect.
C924, C925	352734709	47 μ F, 16V, Elect.
C926	352741009	100 μ F, 16V, Elect.
C951, C952	352731019	100 μ F, 10V, Elect.
C953-C955	352744709	47 μ F, 16V, Elect.
C970	352741009	10 μ F, 16V, Elect.
C14	352750479	4.7 μ F, 25V, Elect.
C15, C19, C20	352741009	10 μ F, 16V, Elect.
C21	352780229	2.2 μ F, 50V, Elect.
	Resistors	
R123-R126	5215022 or 5215003	N08HR20KBC, Semi-fixed
R219, R220	5104148	N12RL10KB25, Variable, preset level
R381, R382	5104149	N12RGL10KB25M, Variable, output level
R511, R512	5225019	N10HR4.7KBD, Semi-fixed
R563, R564	5225078	N10HR47KBDM, Semi-fixed
R585, R586	442524704	47 Ω 1/2W, Metal oxide film
R595-R600	5225078	N10HR47KBDM, Semi-fixed
R687, R688	5225015	N10HR10KBD, Semi-fixed

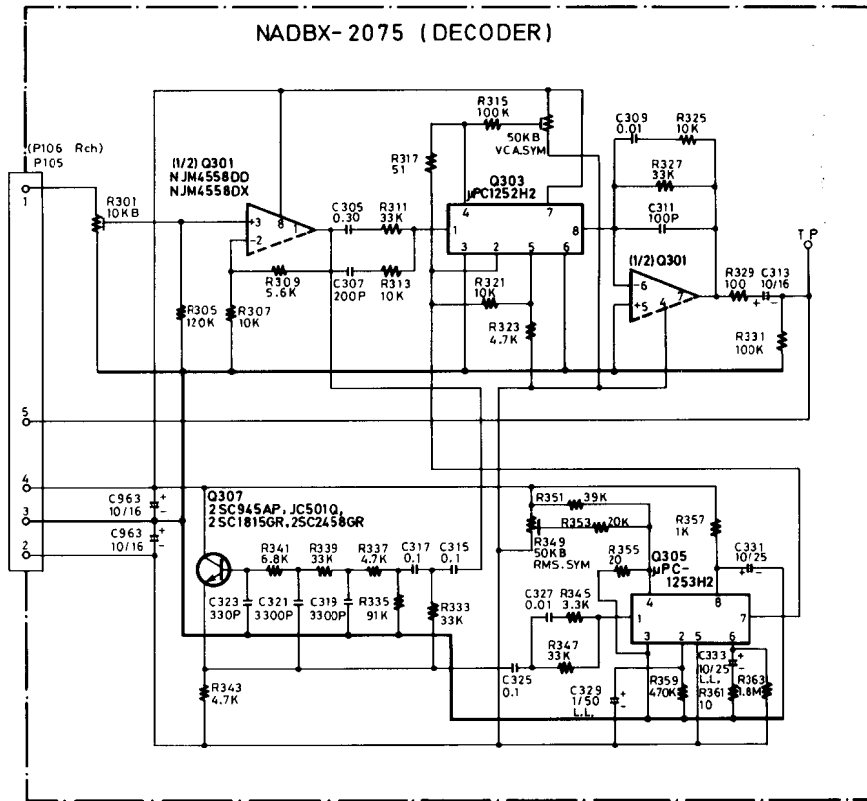
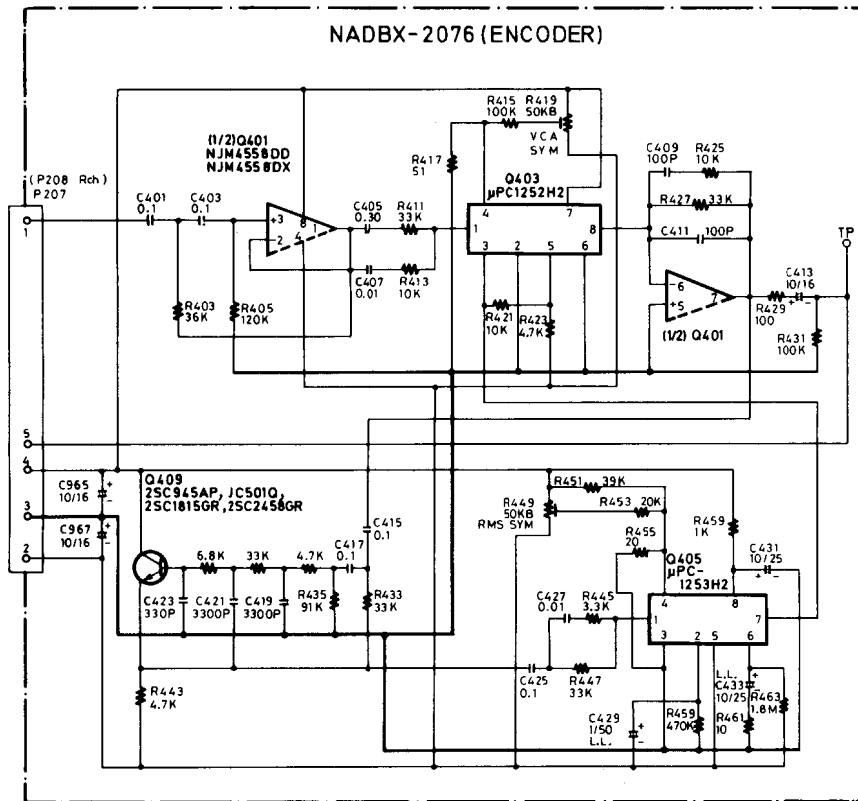
REF. NO.	PART NO.	DESCRIPTION
R901	441522294	0.22Ω 1/2W, Metal oxide film
R903	442523304	33Ω 1/2W, Metal oxide film
R906, R907	441520104	1Ω 1/2W, Metal oxide film
R908	441721804	18Ω 2W, Metal oxide film
R916	441621514	150Ω 1W, Metal oxide film
R27	5225016	N10HR100KBD, Semi-fixed
R28	5225034	N10HR47KBD, Semi-fixed
R49	442525604	56Ω 1/2W, Metal oxide film
	Plugs	
P101, P501	25055045	NPLG-4P-33
P103, P104	25055051	NPLG-8P-39
P105, P106	25055065	NPLG-5P-51
P205, P206	25055051	NPLG-8P-39
P207, P208	25055065	NPLG-5P-51
P502	25055038	NPLG-2P-29
P720	25055137	NPLG-7P-121
P721, P722	25055133	NPLG-3P-117
	Terminals	
P202	25045142	NPJ-4PDBL55, Input/output
P203	25045158	HLJ-4336-3020, Mic.
P201	25050064	NSCT-5P-18, DIN
	Switches	
S205	25065242	NSS-22104, Mic./Line
S101	25035434	NPS-162-242-122-L398, Push
S601	25030248	NRS-144-255BU, NR selector
	Sockets	
J3	2000329	NSAS-12P-288
J6, J7	2000330	NSAS-6P-289
P603	2000341A	NSAS-14P-300
P709a	2000342A	NSAS-6P-301
P707a	2000332	NSAS-6P-291
P708a	2000334	NSAS-4P-293
P706a	2000333	NSAS-6P-292
P505a	2000343A	NSAS-6P-302
P506a	2000306A	NSAS-6P-265
	Radiators	
	27160075A	
	27160156	
	27160011A	
	Spacers	
	223019	AC-229, Transistor
	Bushes	
	223017	AC-310
	Bracket	
	27140915	Volume
	Connectors	
	28320135	For push switch

Dolby decoder circuit (NADOL-2073)

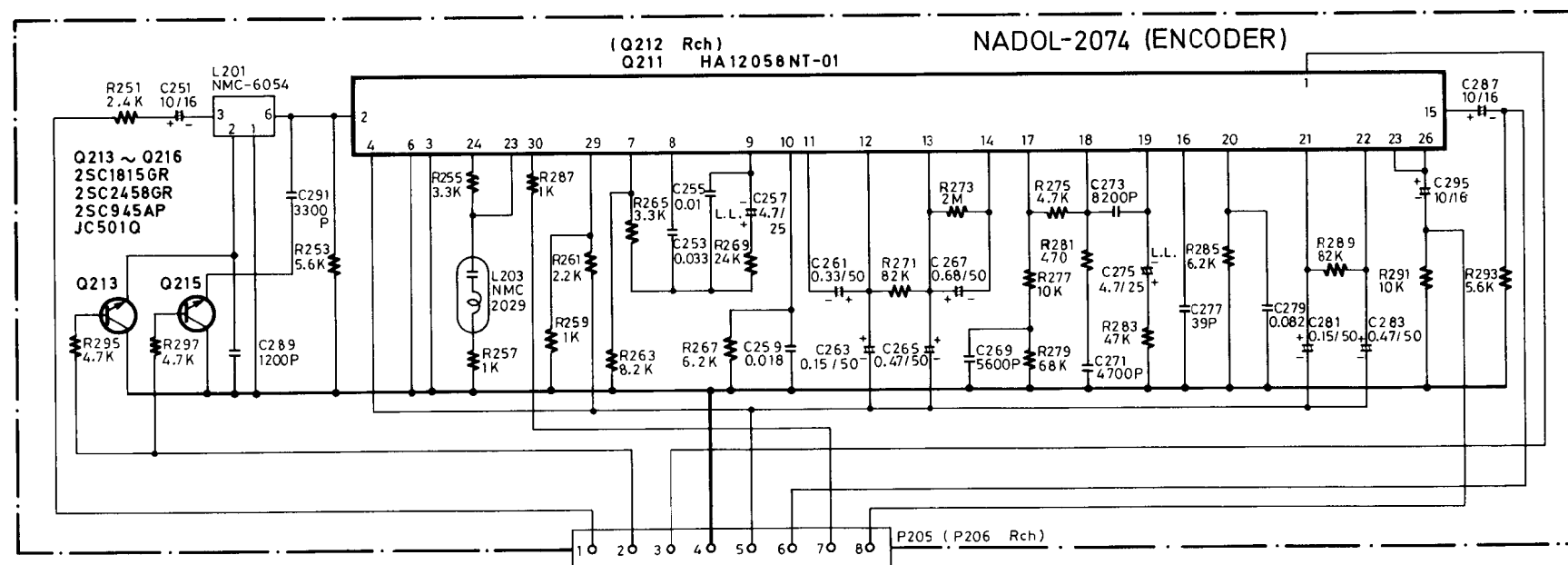
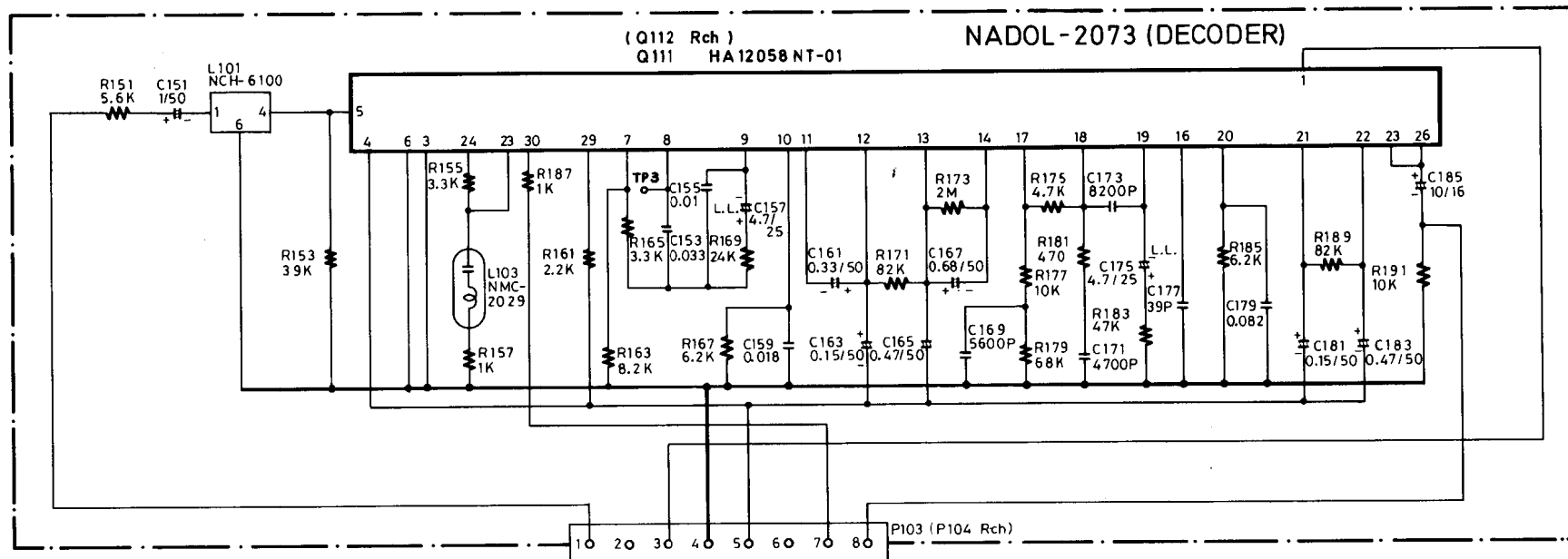
REF. NO.	PART NO.	DESCRIPTION
	ICs	
Q111, Q112	222813,	HA12058NT-01 (Violet),
	222814 or	(Green)
	222815	(Red)
Note: When replace IC HA12058NT-01, use the same color IC for decoder and encoder.		
	Coils	
L101, L102	233327	NCH-6100
L103, L104	233245	NMC-2029
	Capacitors	
C151, C152	352780109	1 μ F, 50V, Elect.
C157, C158	392850477	4.7 μ F, 25V, LL
C161, C162	352783399	0.33 μ F, 50V, Elect.
C163, C164	352781599	0.15 μ F, 50V, Elect.
C165, C166	352784799	0.47 μ F, 50V, Elect.
C167, C168	352786899	0.68 μ F, 50V, Elect.

Note: When replace IC HA12058NT-01, use the same color IC for decoder and encoder.

SCHEMATIC DIAGRAM-DBX SECTION



SCHEMATIC DIAGRAM-DOLBY SECTION



C175, C176	392850477	4.7 μ F, 25V, LL
C181, C182	352781599	0.15 μ F, 50V, Elect.
C183, C184	352784799	0.47 μ F, 50V, Elect.
C185, C186	352741009	10 μ F, 16V, Elect.
	Sockets	
P103A, P104A	25050133	NSCT-8P-35
	Bracket	
	27140916	Pc board
	Screws	
	82143006	3P+6FN (BC), Pan head

Dolby encoder pc board (NADOL-2074)

REF. NO.	PART NO.	DESCRIPTION
	ICs	
Q111, Q112	222813, 222814 or 222815	HA12058NT-01 (Violet), (Green) (Red)
Note: When replace IC HA12058NT-01, use the same color IC for decoder and encoder.		
	Transistors	
Q213-Q216	2211255, 2212115, 2210746 or 2212485	2SC1815 (GR), 2SC2458 (GR), 2SC945A (P) or JC501 (Q)
	Coils	
L201, L202	233328	NMC-6051
L203, L204	233245	NMC-2029
	Capacitors	
C251, C252	352741009	10 μ F, 16V, Elect.
C257, C258	392850477	4.7 μ F, 25V, LL
C261, C262	352783399	0.33 μ F, 50V, Elect.
C263, C264	352781599	0.15 μ F, 50V, Elect.
C265, C266	352784799	0.47 μ F, 50V, Elect.
C267, C268	352786899	0.68 μ F, 50V, Elect.
C275, C276	392850477	4.7 μ F, 25V, LL
C281, C282	352781599	0.15 μ F, 50V, Elect.
C283, C284	352784799	0.47 μ F, 50V, Elect.
C285-C288	352741009	10 μ F, 16V, Elect.
	Sockets	
P205A, P206A	25050133	NSCT-8P35
	Bracket	
	27140916	Pc board
	Screws	
	82143006	3P+6FN (BC), Pan head

Dbx decoder circuit pc board (NADBX-2075)

REF. NO.	PART NO.	DESCRIPTION
	ICs	
Q301, Q302	222811 or 222502	NJM4558DD or NJM4558DX
Q303, Q304	222805	μ PC-1252H2
Q305, Q306	222806	μ PC-1253H2
	Transistors	
Q307, Q308	2211255, 2212115, 2210746 or 2212485	2SC1815 (GR), 2SC2458 (GR), 2SC945A (P) or JC501 (Q)
	Capacitors	
C313, C314	352751009	10 μ F, 25V, Elect.
C329, C330	392880107	1 μ F, 50V, LL
C331, C332	352751009	10 μ F, 25V, Elect.
C333, C334	392851005	10 μ F, 25V, LL
C961-C964	352741009	10 μ F, 16V, Elect.
	Resistors	
R301, R302	5215010 or 5215033	N08HR10KBA, Semi-fixed
R319, R320	5215012 or	N08HR50KBA,

R349, R350	5215035	Semi-fixed
	Sockets	
P105A, P106A	25050130	NSCT-5P32

Dbx encoder circuit pc board (NADBX-2076)

REF. NO.	PART NO.	DESCRIPTION
	ICs	
Q401, Q402	222811 or 222502	NJM4558DD or NJM4558DX
Q403, Q404	222805	μ PC-1252H2
Q405, Q406	222806	μ PC-1253H2
	Transistors	
Q407, Q408	2211255, 2212115, 2210746 or 2212485	2SC1815 (GR), 2SC2458 (GR), 2SC945A (P) or JC501 (Q)
	Capacitors	
C413, C414	352751009	10 μ F, 25V, Elect.
C429, C430	392880107	1 μ F, 50V, LL
C431, C432	352751009	10 μ F, 25V, Elect.
C433, C434	392851005	10 μ F, 25V, LL
C965-V968	352741009	10 μ F, 16V, Elect.
	Resistors	
R419, R420	5215012 or	N08HR50KBA,
R449, R450	5215035	Semi-fixed
	Sockets	
P207A, P208A	25050130	NSCT-5P32

Control circuit pc board (NACOC-2077)

REF. NO.	PART NO.	DESCRIPTION
	ICs	
Q701	222777	LM6402H-425
Q702	222776	LM6402H-424
Q703	222810	LC7800
Q704	222639	LB1275
Q705	222840241	4024BP
Q706	222840692	4069BP
	Transistors	
Q707-Q709	2211455, 2212125, 2210803 or 2212945	2SA1015 (GR), 2SA1048 (GR), 2SA733A (P) or JA101 (Q)
Q710, Q711	2211255, 2212115,	2SC1815 (GR), 2SC2458 (GR),
Q714	2210746 or	2SC945A (P) or
Q744-Q746	2212485	JC501 (Q)
Q712	2211454,	2SA1015 (Y),
Q727-Q734	2212124,	2SA1048 (Y),
Q740-Q743	2210804 or 2212494	2SA733A (Q) or JA101 (P)
Q713, Q716	2201060,	2SD549,
Q717	2201291 or 2201292	2SD985 (K) or 2SD985 (L)
Q715	2201350 or 2201340	2SD687 or 2SD1128
Q718, Q719	2211554	2SA562TM (Y)
Q720	2201074 or 2201385	2SD880 (Y) or 2SD330 (E)
Q721, Q722	2211254, 2212114,	2SC1815 (Y), 2SC2458 (Y),
	2210747 or 2212484	2SC945A (Q) or JC501 (P)
Q723, Q724	2211683 or 2211612	2SD468 (C) or 2SD471 (L)
Q725, Q726	2211563	2SB562 (C)
Q735-Q738	2211706	2SD655 (F)
Q739	2211544	2SC1959 (Y)

PRINTED CIRCUIT BOARD PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
	Diodes	
D701	223155	1SS138
D705	2239552,	RD8.2EB2,
	2243192 or	MTZ8.2B or
	2242866	EQA02-08C
D706	223145 or	1S2076TD or
	223150	US1040
	X'tal	
X701	3010069	CSB800A
	Capacitors	
C701	352750479	4.7 μ F, 25V, Elect.
C702-C704	352780109	1 μ F, 50V, Elect.
C705	352784799	0.47 μ F, 50V, Elect.
C706	352741009	10 μ F, 16V, Elect.
C712	352732209	22 μ F, 16V, Elect.
C715	352734709	47 μ F, 10V, Elect.
C718	352781599	0.15 μ F, 50V, Elect.
	Resistors	
R701-R711	49163392411	3.9k Ω x11, 1/10W, Network
R713-R716	49163392404	3.9k Ω x4, 1/10W, Network
R726-R731	49163392406	3.9k Ω x6, 1/10W, Network
R732-R742	49163392411	3.9k Ω x11, 1/10W, Network
R743-R746	49163392404	3.9k Ω x4, 1/10W, Network
R761	5215045 or	N08HR10KBC,
	5215021	Semi-fixed
R763	441722204	22 Ω , 2W, Metal oxide film
R785-R796	49163392412	3.9k Ω x12, 1/10W, Network
R814-R817	49163392404	3.9k Ω x4, 1/10W, Network
R832	4000102	TD5-410D, Thermistor
	Plugs	
P702	25055046	NPLG-10P-34
P703	25055067	NPLG-9P-53
P704	25055154	NPLG-10P-138
P705	25055148	NPLG-4P-132
P706, P707	25055147	NPLG-3P-131
P708	25055146	NPLG-2P-130
P709	25055100	NPLG-3P-84
	Socket	
	25055151	NSAS-7P-135

Display circuit pc board (NADIS-2078)

REF. NO.	PART NO.	DESCRIPTION
	LEDs	
D631-D633	225137	SEL-2413E
D634	225142	SEL-2913K
D635, D636	225137	SEL-2413E
D637	225142	SEL-2913K
D638, D639	225137	SEL-2413E
D640	225142	SEL-2913K
D641, D642	225137	SEL-2413E
D706	225142	SEL-2913K
D707-D709	225137	SEL-2413E
D710	225142	SEL-2913K
D711	225137	SEL-2413E
D712-D714	225142	SEL-2913K
D718-D724	225137	SEL-2413E
D725	225142	SEL-2913K
	Sockets	
P720a	2000335	NSAS-7P-294
P721a	2000344	NSAS-3P-303
P722a	2000339	NSAS-3P-298
	Holder	
	27190294A	LED
	Screws	
	834430068	3TS+6B (BC), Tapping

Switch pc board (NASW-2079)

REF. NO.	PART NO.	DESCRIPTION
S710-S715	25035389	NPS-111-S353, Push switch
P710a	2000354	NSAS-14P-312, Socket

Counter indicator pc board (NADIS-2080)

REF. NO.	PART NO.	DESCRIPTION
D726	225094	SL-2405-20, LED

Remote control terminal pc board (NARM-2081)

REF. NO.	PART NO.	DESCRIPTION
P701	25050070	NSCT-7P20, Socket, DIN

Switch pc board (NASW-2082)

REF. NO.	PART NO.	DESCRIPTION
S716-S718	25035389	NPS-111-S353

Timer switch pc board (NASW-2083)

REF. NO.	PART NO.	DESCRIPTION
D702-D704	223155	1SS138
S720	25065170	NSS-2377

Power switch pc board (NASW-2084)

REF. NO.	PART NO.	DESCRIPTION
C901	3500065A	0.01 μ F, 400V, AC, Capacitor
		IS
C901a	27300601	SB-1925, Cover
S901	25035375	NPS-111-L339P, Power
		switch
	27140823	Bracket, switch
	28320135	Connector, power switch
	82143006	3P+6FN (BC), Pan head screw

Edge light pc board (NAPL-2085)

REF. NO.	PART NO.	DESCRIPTION
PL701	210090	PL14V150mA, Lamp

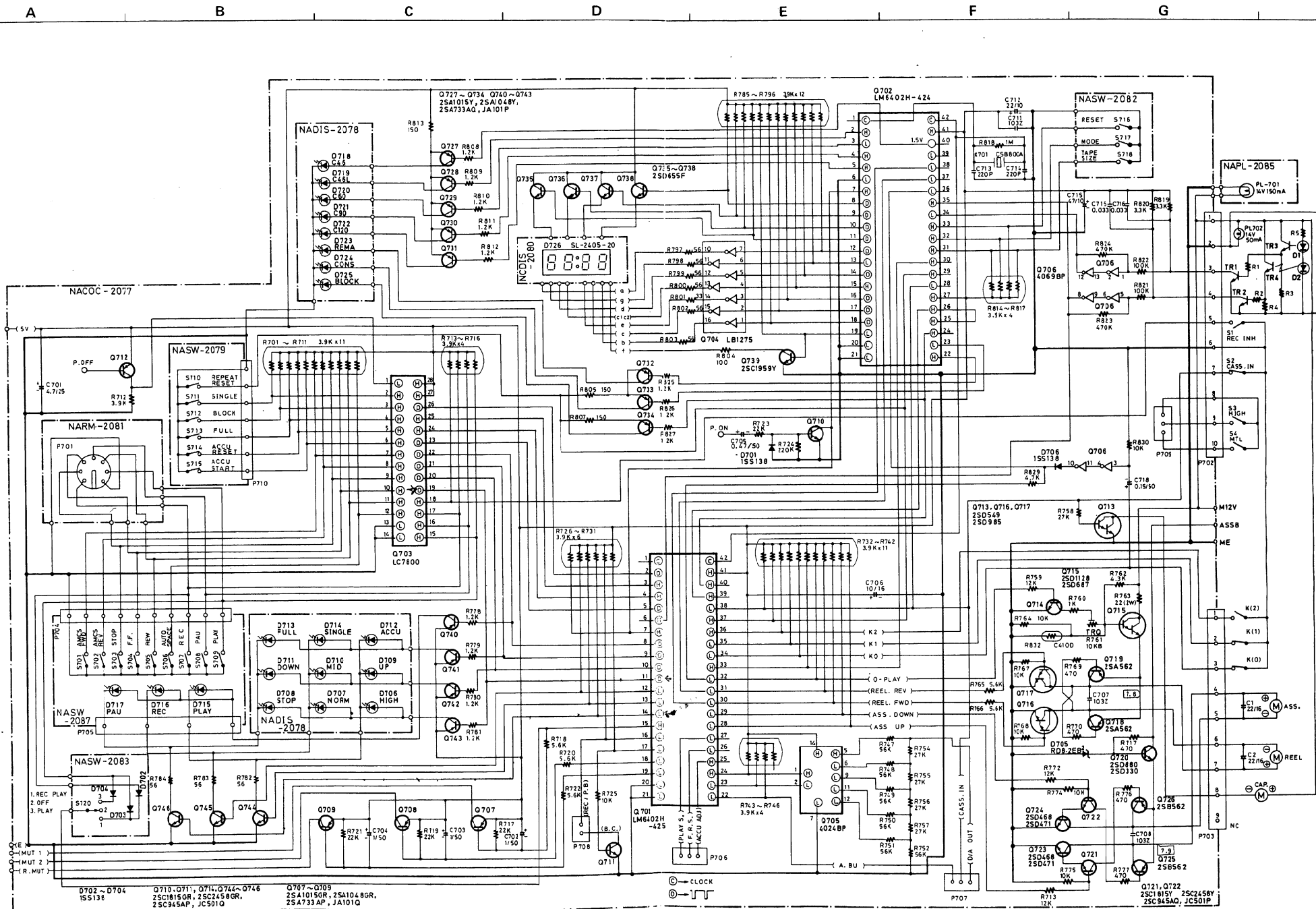
Record callibration volume pc board (NAVR-2086)

REF. NO.	PART NO.	DESCRIPTION
R507, R508	5104159	N09RLC10KB25M
		Resistor, variable
P505, P506	25055100	NPLG-3P-84, Plug

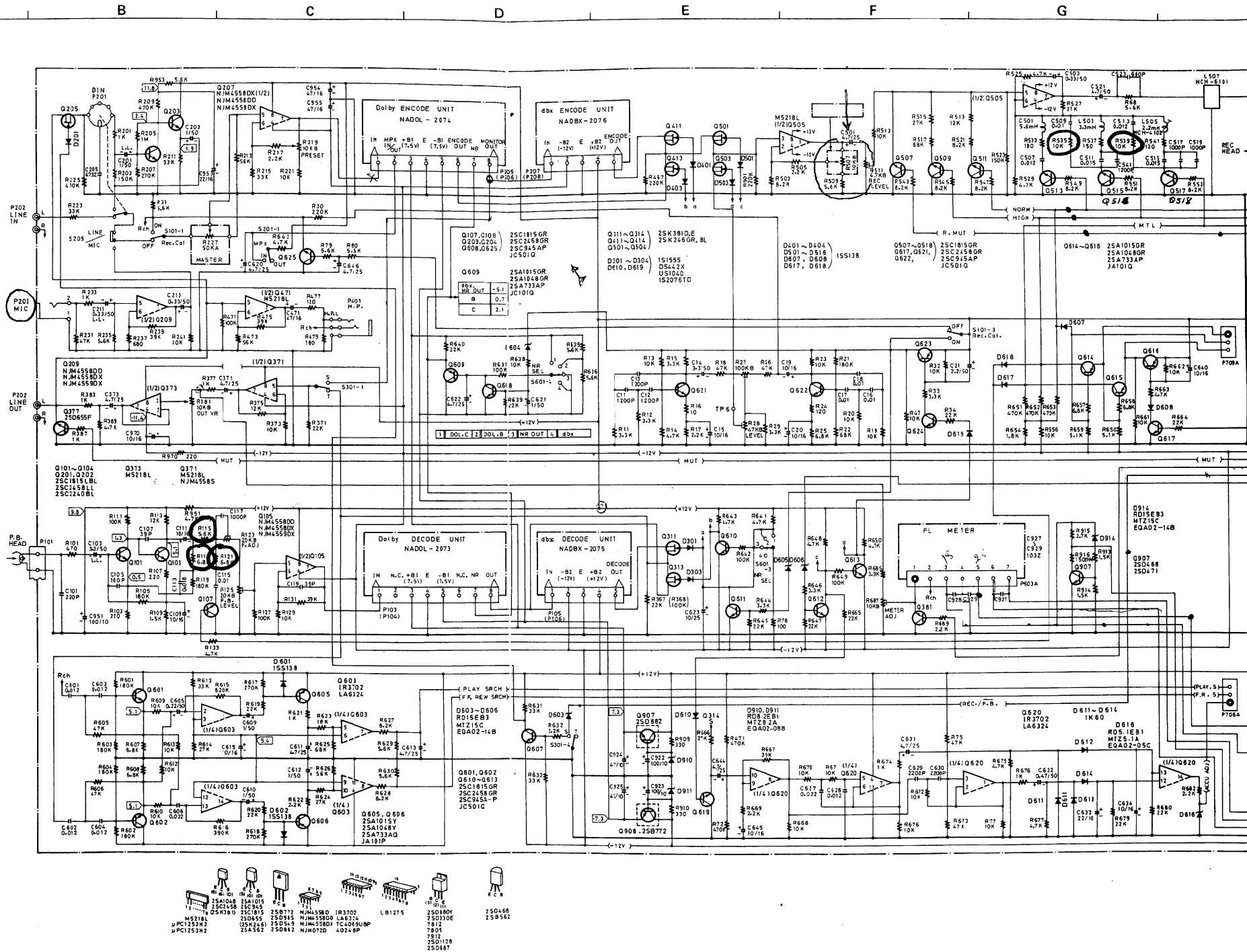
Switch pc board (NASW-2087)

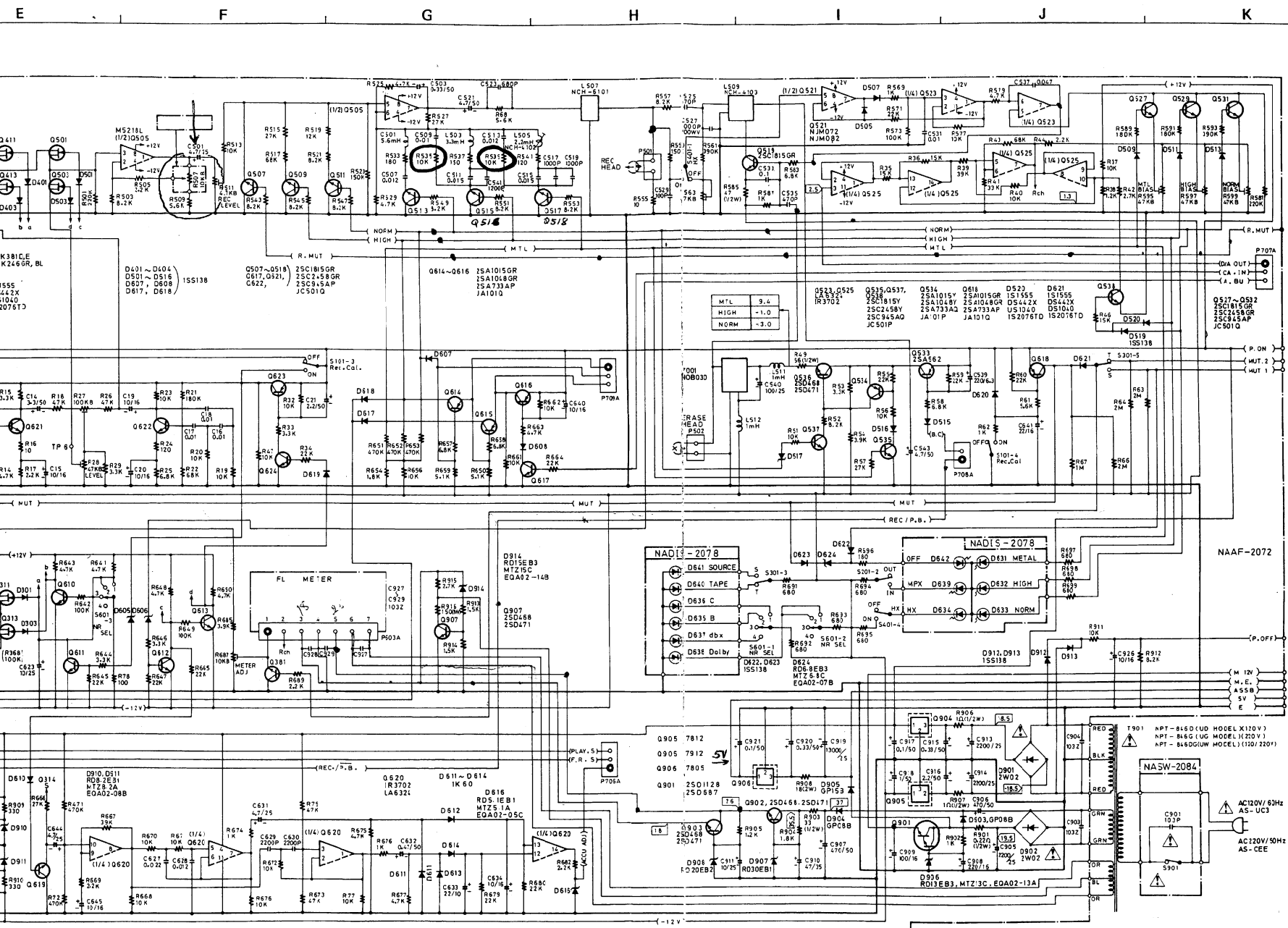
REF. NO.	PART NO.	DESCRIPTION
D715	225134	GL-3NG1, LED
D716, D717	225126	GL-3PR1, LED
S701-S709	25035408	NPS-111-S372, Push switch
P704a	2000323	NSAS-10P-282, Socket
P705a	2000324	NSAS-4P-283, Socket
	27270103	Spacer, LED

SCHEMATIC DIAGRAM-CONTROL SECTION



SCHEMATIC DIAGRAM-AMPLIFIER SECTION

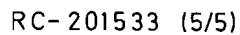




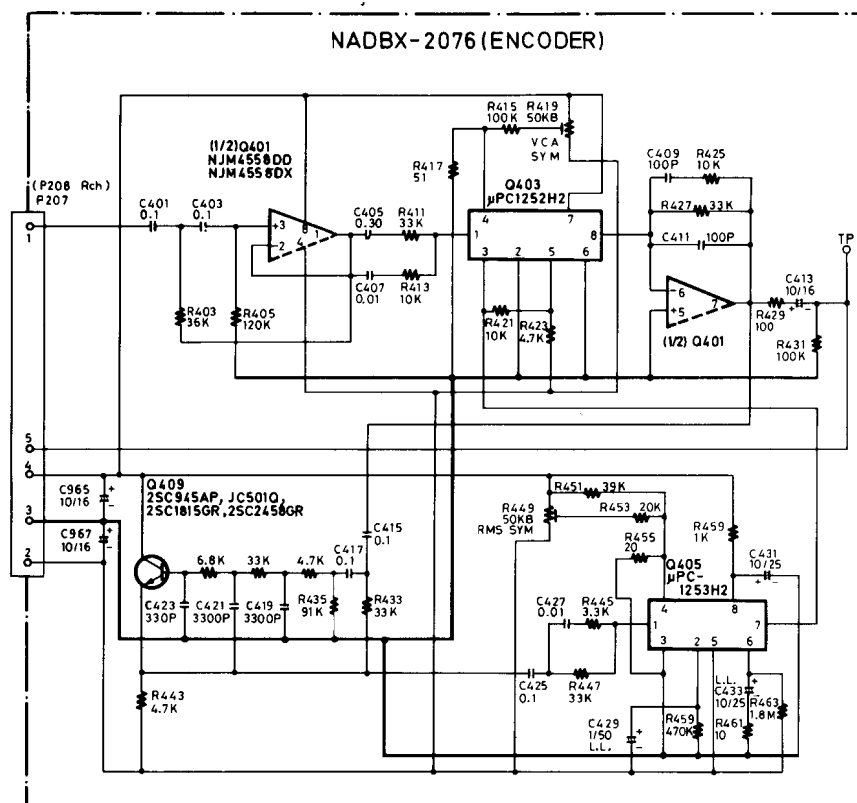
NOTE:

- ALL RESISTORS ARE IN OHMS 1/4WATT AND 1/2WATTS UNLESS OTHERWISE NOTED.
- ALL CAPACITORS ARE IN μ F/50V UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITOR (— $\frac{1}{2}$ —) ARE IN μ F/25V
- VOLTAGE (MEASURED WITH V.T.V.M.) \square IS DC VOLTAGE (NO INPUT SIGNAL)
- THE COMPONENTS IDENTIFIED BY MARK Δ ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.

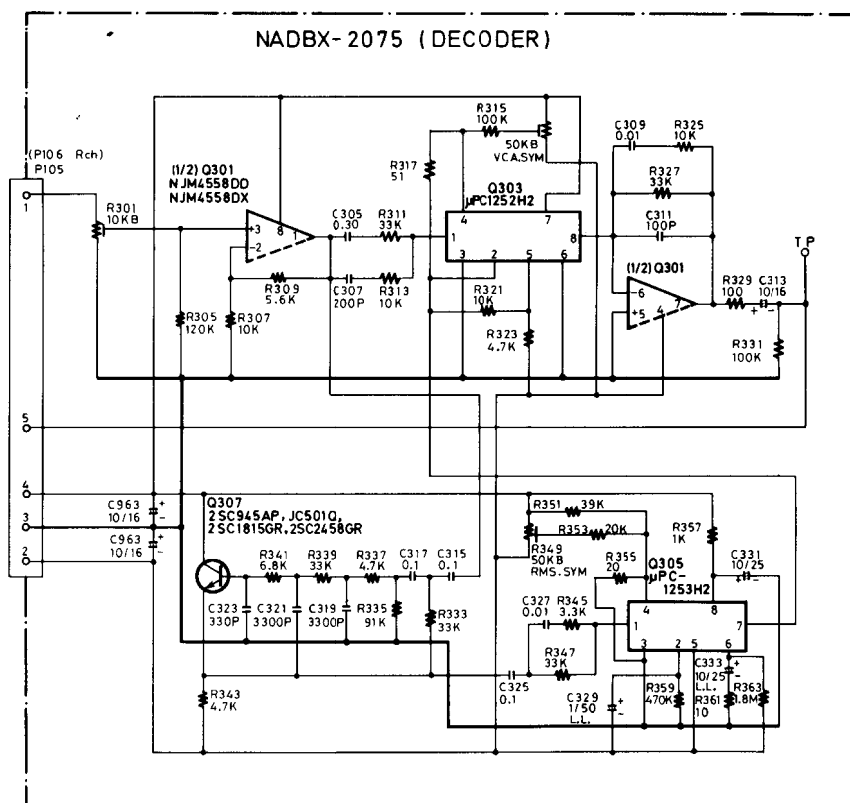
-32-



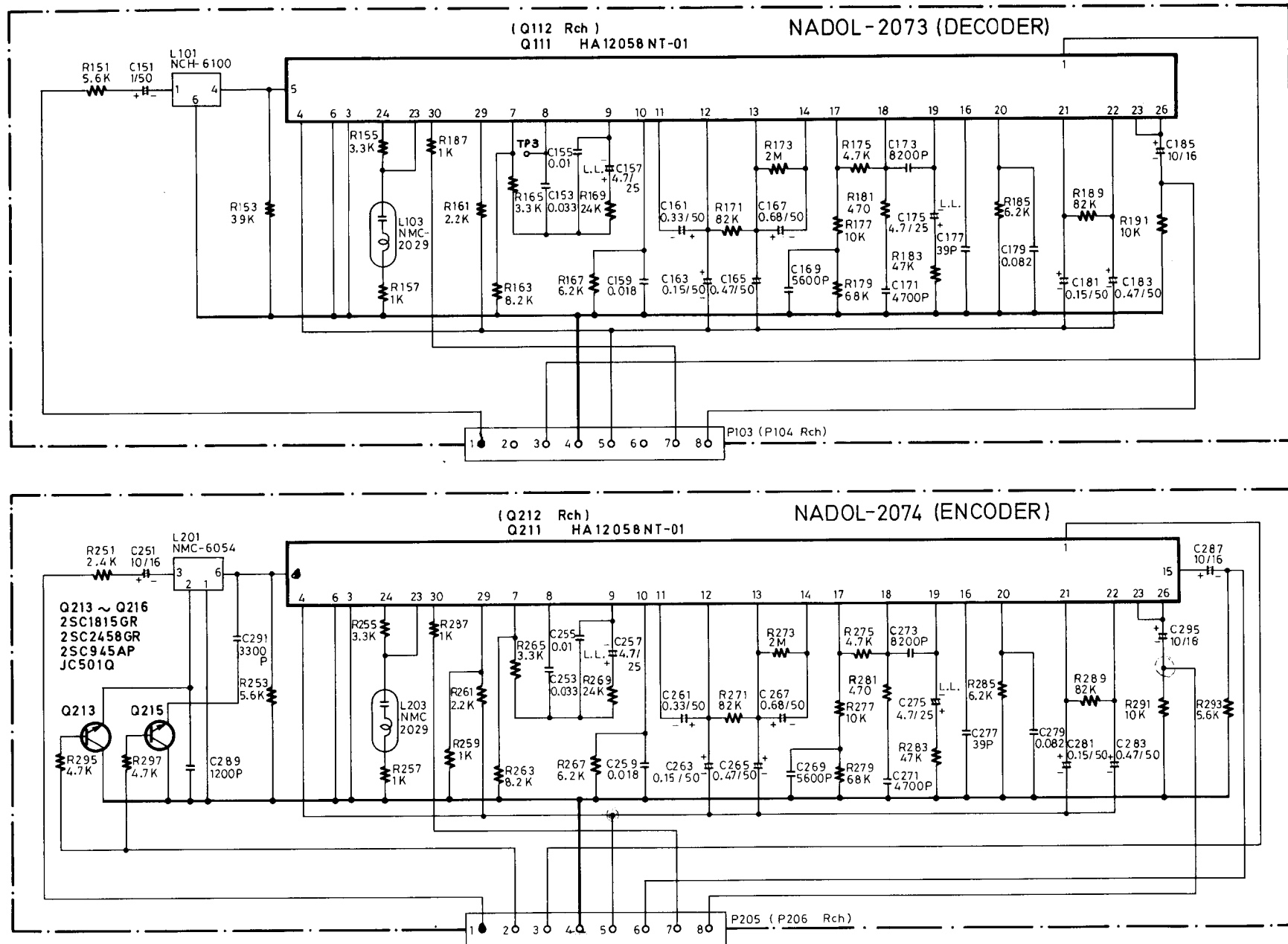
NADBX-2076 (ENCODER)

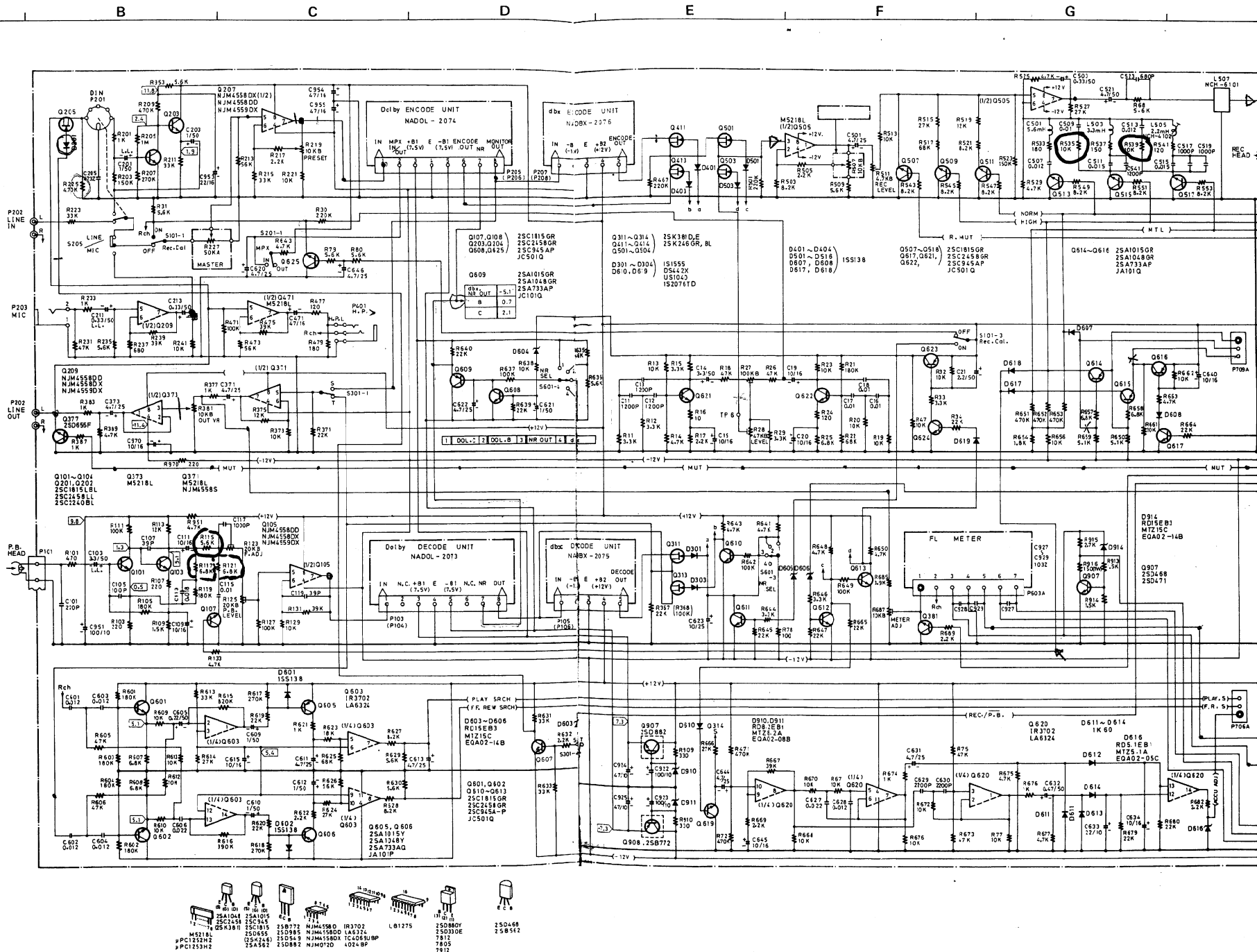


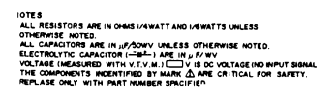
NADBX-2075 (DECODER)



SCHEMATIC DIAGRAM-DOLBY SECTION







SCHEMATIC DIAGRAM-METER SECTION

